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COMPUTERWORLD

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Static RAM distinguishes new Cray supercomputers from older models. Page 8.

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NEWSPAPER

Junior PS/2 to be cast in net role

Wide target for compact Model 25 includes LANs, links to System/36, 38

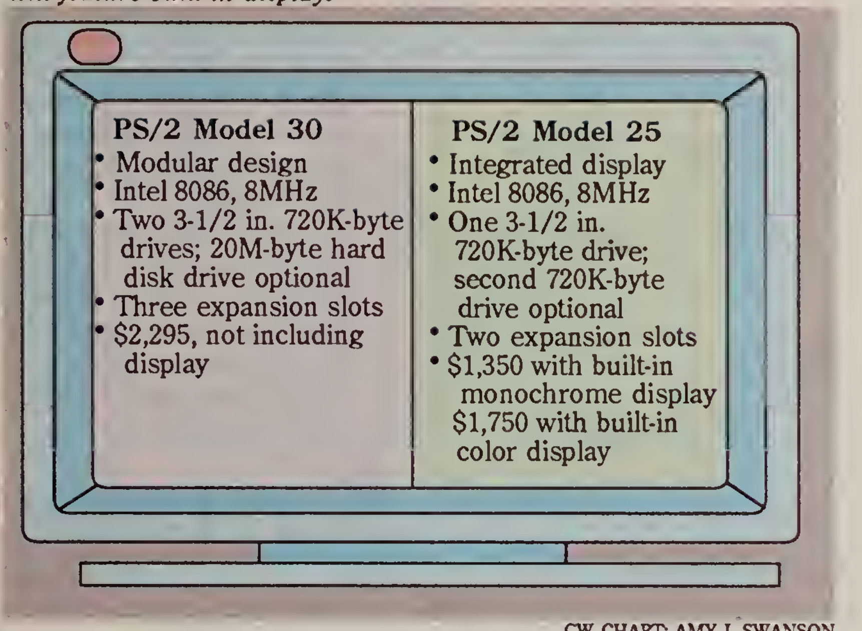
BY DOUGLAS BARNEY
CW STAFF

NEW YORK — IBM will broaden its Personal System/2 microcomputer line tomorrow with the announcement of the Model 25, a low-end machine with a built-in monitor aimed at corporate networked environments and priced from $1,350.

While the long-anticipated system is targeted largely at the education and casual-user markets, the small-footprint machine was also designed to operate in local-area network environments and with IBM System/36 and 38 host processors.

Shooting low

Specifications from IBM documents indicate new PS/2 Model 25 will be functionally similar to, but less expandable than, the Model 30 and will feature built-in displays



PS/2 Model 30
- Modular design
- Intel 8086, 8MHz
- Two 3-1/2 in. 720K-byte drives; 20M-byte hard disk drive optional
- Three expansion slots
- $2,295, not including display

PS/2 Model 25
- Integrated display
- Intel 8086, 8MHz
- One 3-1/2 in. 720K-byte drive; second 720K-byte drive optional
- Two expansion slots
- $1,350 with built-in monochrome display $1,750 with built-in color display

CW CHART: AMY J. SWANSON

According to IBM documents obtained by *Computerworld*, the Intel Corp. 8086-based model provides "network solutions when configured in a program and data sharing environment." An IBM official, however, declined to comment on the machine, which is scheduled to be announced at a press conference here.

Distinguishing displays

Two versions of the Model 25, distinguished by monochrome and color displays, will be available at the time of announcement and cost $1,350 and $1,750, respectively, according to the documents.

The 8-MHz zero-wait state 8086 machine, which has only two expansion slots and cannot be purchased with a hard disk drive, is the most limited of the PS/2 family.

Despite the Model 25's limitations, users contacted last week said they approve of the IBM strategy of selling low-cost machines intended for network use.

The $1,350 Model 25-001 comes with a built-in 12-in. monochrome analog display, one

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Race is on to speed up twisted-pair

BY PATRICIA KEEFE
CW STAFF

Major networking vendors are racing to be first to market with what many observers consider a technological breakthrough: 10M bit/sec. Ethernet running over unshielded twisted-pair, or standard telephone, wiring.

Beta-test users of one vendor's high-speed Ethernet product last week enthusiastically endorsed the technology, which they said is cost-effective and operates virtually error-free.

Leading the pack of networking companies pursuing the new technology are 3Com Corp. in Santa Clara, Calif., and Synoptics, Inc. in Mountain View, Calif. Both firms have announced fourth-quarter delivery dates and are winding down their beta testing of separate efforts to port high-speed Ethernet to inexpensive and somewhat unstable telephone wiring.

Competitors, including AT&T, Hewlett-Packard Co., Digital Equipment Corp. and Ungermann-Bass, Inc., are said to be working on similar projects. AT&T is reportedly readying a 10M bit/sec. version of its Starlan to run over its Premises Distribution System cabling. 3Com said Nynex Corp. is considering using its system.

Running high-speed Ethernet over unshielded twisted-pair wire is expected to have a significant impact on users, particularly those located in major cities in older buildings already stuffed to capacity with cabling.

Many of these users, who have patched and repatched a tangled mass of transmission

Continued on page 81

AT&T bids for bigger T1 prize

BY ELISABETH HORWITT
CW STAFF

BASKING RIDGE, N.J. — Accelerating its drive into the private wideband networking arena, AT&T last week announced a T1 switch and a network management system that can communicate with its Accunet services.

The company also announced a bit-compression multiplexer designed to enable a T1 link to support twice the normal number of 64K bit/sec. channels.

The introduction of the Dataphone II 745 Acculink multiplexer will help AT&T catch up with — but not surpass — leading T1 vendors such as Network Equipment Technologies Corp. and Timeplex, Inc., according to Peter Bernstein, a senior research analyst at Probe Research, Inc. in New York.

Several companies offer switches with several times the 745's capacity of up to 16 T1 lines, and many provide interfaces with AT&T's Accunet services.

AT&T hopes, however, to leverage its dual role as carrier and equipment vendor to provide customers with a more compre-

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HP: Color me ink-jet

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Undercutting the price of pen plotters and offering faster output than color dot matrix printers, Hewlett-Packard Co. is scheduled to introduce today a color ink-jet device priced at less than $1,400.

The Paintjet thermal ink-jet printer is said to produce a page of presentation-quality color graphics in four minutes.

Using an enhanced version of the same basic technology as HP's existing Thinkjet printer, the color graphics Paintjet device can print up to 180 dot/in., according to Robert Borden, product line manager for the vendor's San Diego division.

The Paintjet can use plain paper or a specially coated HP-supplied paper. The fast-drying HP paper, which costs 6 cents per sheet, controls dot size and circularity, resulting in color output that is more vivid than on plain paper, according to Borden.

Although Paintjet's resolution is only half the maximum dot density of Epson America, Inc.'s LQ-2500 color dot matrix printer and is inferior in output quality to high-priced pen plotters, its graphics are "highly acceptable" for most personal printer applications, according to one HP user who has seen the product.

"My own gut feeling is that by

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IN THIS ISSUE

New designs. Sun shines at Siggraph with new desktop graphics workstations including the 3/60 series, with high-end features like memory expansion options and color display, and the CXP line, with 3-D graphics capability. Page 4.

Memory refresher. Revamped Cray-2 line uses static RAM chips that provide a 25% average throughput gain over dynamic RAM models and feature an access time of 55 nsec. Page 8.

NEWS

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5 CAD/CAM field open to workstations and PCs, Siggraph-goers say.

6 DG users optimistic about firm's recovery.

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10 U.S. appoints officer to untangle finances.

10 Imagen software upgrade allows compatibility with Postscript.

12 Computer Associates' customers question future support, service.

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17 ADR cancels Adroit sale, forms product division.

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17 Harris adds supermini to middle of Unix-based line.

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80 Ashton-Tate unveils Master Graphics package.

80 Apple expected to show its answer to PS/2 at conference.

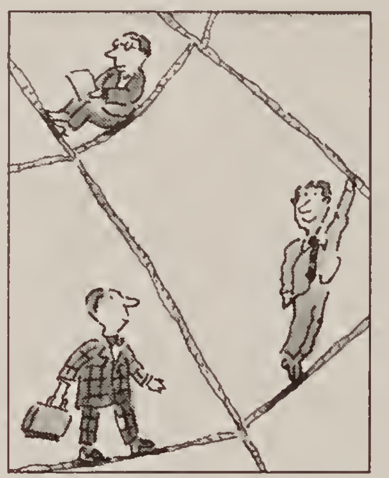
80 AST says Turbolaser/EL performs like Laserjet II, costs less.

81 Microsoft acquires developer of Mac applications.

81 Pansophic interface links Easytrieve Plus, DB2, SQL/DS.

81 Compaq sales unaffected by PS/2.

82 Memorex to supply CPU upgrades for System/38.



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35 Bridge announces net management for TCP/IP.

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43 EMC unveils optical-disk subsystem for VAX.

Quotable

"No one piece of hardware will enable IBM to get the upper hand. It was not pieces of hardware that got DEC the upper hand, it was networking functionality."

MARC SCHULMAN
SALOMON BROTHERS, INC.

On IBM's 9370 threat to DEC in the mid-range.

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53 West, Northeast split highest DP pay honors.

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Editor's note

Microsoft Corp. last week disputed a July 27 *Computerworld* report that a Microsoft official confirmed the company's plans to ship the Presentation Manager component of its MS OS/2 operating system during the first half of 1988. Microsoft denied that the official, Paul Sribhibhadh, had confirmed such plans.

This issue arose from a series of communications problems that occurred during preparation of the story. CW attempted to confirm with Sribhibhadh reports by reliable sources close to Microsoft that the Presentation Manager would ship by the second quarter of 1988.

Sribhibhadh last week said that, in the interview, he confirmed a second-quarter shipping date for a Microsoft Unix/Xenix merge product and discussed the firm's plans for "Presentation Manager-style" interfaces. He said he did not comment on plans for the MS OS/2 Presentation Manager and was not aware of those plans.

The CW reporter's notes and recollections from the interview differ from those of Sribhibhadh and indicate that the confirmation referred directly to the MS OS/2 product. This information was supported by a reliable source close to IBM, who said the second-quarter date was "on target with IBM's internal scheduling."

However, a review of the reporter's notes indicated a quote used in the story was incomplete, and omitted information indicating Sribhibhadh may have been referring to Presentation Manager-style interfaces and not the Presentation Manager's ship date.

CW attempted to contact both Microsoft and its public relations agency for further comment on the story before it went to press. Microsoft did not return a reporter's call because of an internal communications error, according to Steve Ballmer, vice-president of Microsoft's Systems Software Division. He said the public relations agency has no record of a call from a CW reporter.

"We have not announced a date for the Presentation Manager's availability," Ballmer said last week. "I have not set in my mind a date for that availability. We are committed to letting people know in the fourth quarter what that date will be."

Burst pipe soaks CPUs

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — A burst water pipe above the data center at the Wall Street headquarters of Goldman, Sachs & Co. destroyed millions of dollars worth of IBM mainframes, soaked computer tapes and downed systems for two workdays.

The cast-iron pipe directly above the IBM equipment on the ninth floor of the building at 85 Wall Street cracked before the start of work on the morning of Thursday, July 23, spilling water as far as four floors below, sources said.

The burst pipe showered the IBM processors with soggy ceiling tiles, according to one source who saw the damage. "Everything was covered with the stuff, like mud," said the source, who requested anonymity.

Several mainframes that were ruined were replaced by IBM shortly after the water was cleared, and all the firm's systems were put back in operation the following weekend, according to Fred Krimendahl, the partner in charge of operations at Goldman Sachs.

Millions of dollars worth of ruined computer equipment was covered by insurance, said Krimendahl, who declined to provide a dollar figure for the damage or to identify the models involved.

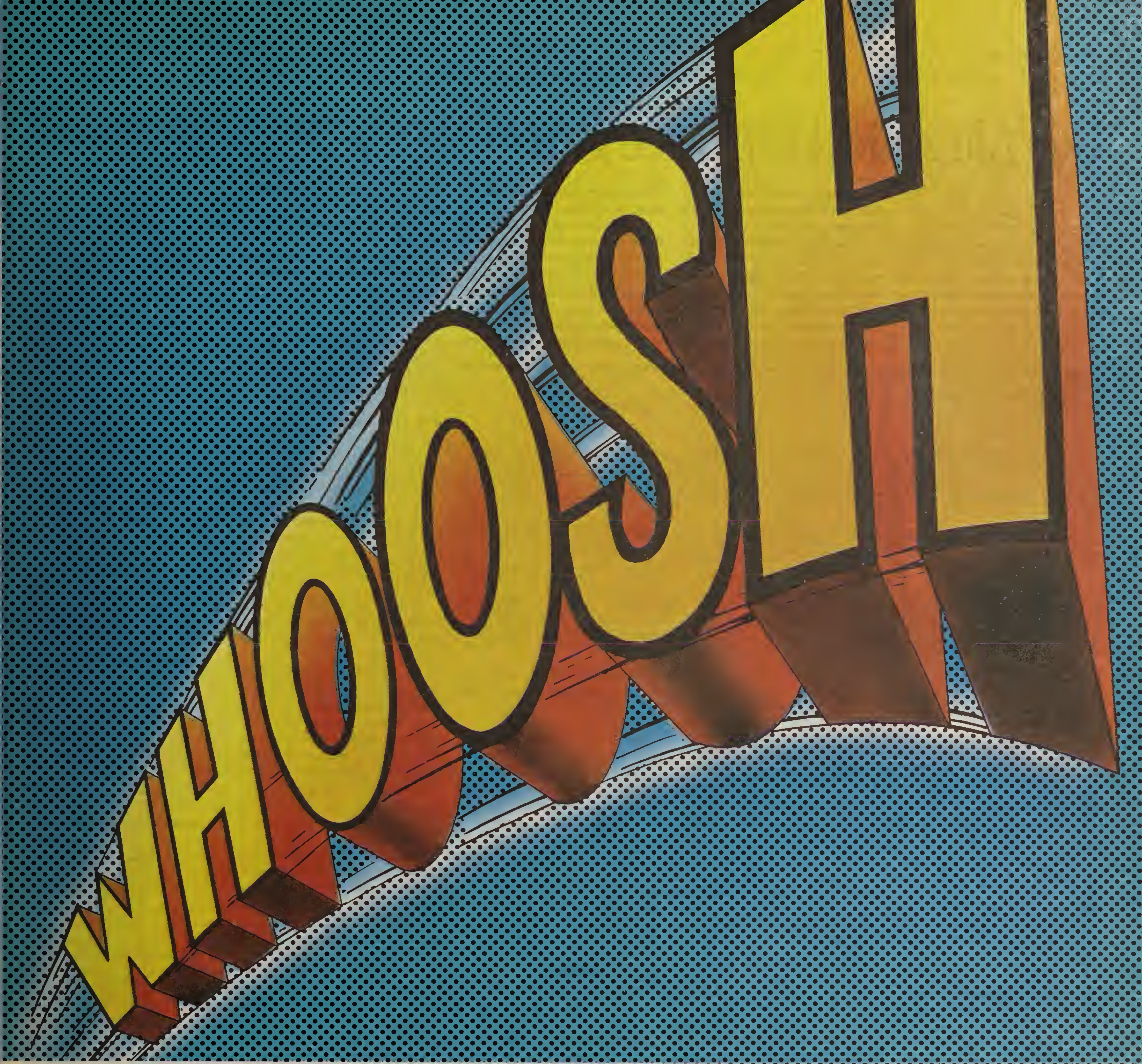
Goldman Sachs is currently converting its production systems from Unisys Corp. to IBM processors. The incident affected the firm's entire IBM environment, including production and test systems.

Modest interruptions

The water pipe burst after much of Thursday night's production work had been completed and caused only modest interruptions to business, according to Krimendahl. The incident delayed some confirmations of orders and reports for employees, he said.

A number of tapes were soaked and had to be cleaned and dried, Krimendahl said. Those tapes that were destroyed were for systems in development, and replacement involved only a few days work, he said.

The water inflicted less severe damage to Unisys peripherals and to two Wang Laboratories, Inc. systems located farther away from the pipe. The vendors of that equipment also provided replacements, and another Wall Street firm loaned Goldman Sachs some equipment.



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Sun plugs desktop price gap

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — A slew of product announcements from Sun Microsystems, Inc. in Mountain View, Calif., including a line of desktop graphics workstations, highlighted last week's Siggraph '87 show here.

Expanded horizon

Sun's 3/60 series fills in the company's line with more expandability options

	3/50	*3/60*	*3/110*	*3/140*	*3/160*	*3/260*	*4/260*
Processor	MC68020	MC68020	MC68020	MC68020	MC68020	MC68020	MB86900
Clock speed MHz	15	20	16.67	16.67	16.67	25	16.67
*MIPS**	1.5	3	2	2	2	4	10
Main memory (in bytes)	4M	4M to 24M	4M to 12M	4M to 12M	4M to 16M	8M to 32M	8M to 128M
Disk capacity (in bytes)	71M to 282M	71M to 282M	71M to 282M	71M to 282M	71M to 1.2G	141M to 1.2G	280M to 1.2G
Base price	$4,995	$7,900 (monochrome) $9,900 (color)	$15,000 (color only)	$12,900 (monochrome only)	$19,900	$28,900	$39,900

*Million instructions per second

INFORMATION PROVIDED BY SUN MICROSYSTEMS, INC.
CW CHART

The company's Sun-3/60 series reportedly gives users access to high-end workstation features such as 3 million instructions per second (MIPS) performance, memory expansion options and 8-bit color-display capabilities.

The system will sell for $9,900 in its color version and $7,900 for the monochrome version, according to Andreas Bechtolsheim, vice-president of technology and one of the founders of Sun.

Continued support

While the MIPS rating and clock speed are higher on the 3/60 than on the Sun-3/110, 3/140 and 3/160 workstations, company spokeswoman Karen Rohack said Sun will continue to support the older products.

"Because our 3/60 doesn't offer the VMEbus, we will continue to offer those other products as long as the customer is still interested in them," Rohack said. "If a customer wants VMEbus expansion capability, then the 3/110 or 3/140 would be the model or workstation he would want to purchase."

Rohack said that while she suspects the 3/60 sales will slow the sales of the 3/110 and 3/140, the company currently has no plans to stop production of those models.

Bechtolsheim said the 3/60 desktop line offers 4M bytes of main memory, expandable to 24M bytes; a 20-MHz Motorola, Inc. MC68020 CPU; a 32-bit, 20-MHz MC68881 floating-point coprocessor; two RS-423 serial ports; and a small computer systems interface port for linking mass-storage devices and autoselectable standard or thin Ethernet interfaces. Also available are storage options and five monitor configurations.

One Los Angeles-based computer systems designer said that for the price of a personal computer with Unix and added memory and graphics boards, he could purchase the Sun color workstation, while also retaining a clear growth path extending up to 10 MIPS.

The workstations can function as stand-alone systems, small file servers or diskless nodes in a distributed computing environment, sharing file and printer resources, the company said.

Sun also announced last week its CXP line of graphics workstations with graphics acceleration that add two- and three-dimensional graphics capability to the company's workstations.

Shadier deal

The high-end CXP models reportedly provide greater shading performance and increased 3-D vector performance than previous systems, the company claimed. The product line includes the Sun-4/260CXP, the Sun-3/260CXP and the Sun-3/160CXP, and each model includes new graphics acceleration hardware and software.

Prices range from $32,900 to $95,500.

Announced to complement the CXP line were TAAC-1 application and graphics accelerator systems.

The TAAC-1 reportedly allows Sun workstations to be used in new application areas, including imaging, high-end visualization and simulation.

Mix and match

Developed by Sun's High-End Graphics/Accelerator Projects team, which was formerly Trancept Systems, Inc. in Raleigh, N.C., the applications and graphics accelerator systems combine attributes of array processors, image processors and graphics accelerators into one programmable product.

It is priced at $25,000 when ordered as an option for Sun-3 and Sun-4 workstations, the vendor said.

In another announcement concerning the workstation vendor, Prime Computer, Inc. in Natick, Mass., announced it has signed a contract to purchase Sun-3/60 workstations from Sun as platforms for Prime's family of computer-aided design and engineering solutions. The pact is valued at $75 million over a three-year period.

Under the agreement, Prime has ported its Prime Medusa 2-D and 3-D mechanical design and drafting software to the 3/60 workstations and will sell the software and hardware combination as a single package called the WS3600. According to Bob Fischer, president and CEO of Prime's CAD/CAM & Engineering/Scientific Group, the WS3600 will be priced in the $40,000 range.

Siggraph hosts product parade

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — Product introductions, upgrades and additions marked last week's Siggraph '87 conference and exhibition here.

According to show coordinators, there were 27,800 attendees and 271 exhibitors as of Wednesday.

New products included a series of high-performance display controllers designed for use in VMEbus-based systems, displayed by Metheus Corp. in Hillsboro, Ore. The four models cover a range of resolution and bit-plane options, the firm said.

The series uses Metheus's very large-scale integration graphics components, including the Graphics Processing Unit, a single-chip general-purpose processor optimized for graphics and rated at 4 million instructions per second (MIPS), and the Memory Control Unit, which controls raster memory and carries out low-level graphics tasks. Deliveries are scheduled to start in September, and prices range from $2,495 to $3,995.

Ramtek Corp. in Santa Clara, Calif., announced its Ramtek 4322 high-performance color graphics processor and video display. The system features 1,280- by 1,024-pixel screen resolution and displays up to 256 screen colors from a palette of 4,096. The desktop unit is designed to function with several host computers. The single-unit list price is $8,995.

Control Data Corp. introduced four high-performance three-dimensional graphics workstations, including two reduced instruction set computer-based 10-Dhrystone MIPS workstations. The St. Paul, Minn.-based company said pricing ranges from $25,545 to $84,900. CDC's Integrated Manufacturing Group announced its Sabre series of high-performance, high-capacity 8-in. disk drives, including a 750M-byte Sabre IV.

Mercury Computer Systems, Inc. in Lowell, Mass., introduced its MC3200 series single-board, high-speed coprocessor family for the IBM Personal Computer AT and compatible computers, including Apollo Computer, Inc. 3000 and 4000 series workstations. The microsupercomputer is a 10-MIPS processor that executes computation-intensive vector and scalar operations at speeds of up to 20 million floating-point operations per second, the company said.

According to Mercury's district sales manager Paul Barr, the unit is Fortran- and C-driven and fits into a single slot on the AT or compatible. It is scheduled to begin shipping this month in volume, and prices will range from $6,000 to $16,000. The AT-compatible configuration draws 15W from the host bus.

Austin, Texas-based Nova Graphics International Corp. announced its NovaCGI, a firmware-based computer graphics interface that reportedly fully conforms to ANSI and ISO standards. The interface is designed to facilitate device independence and software transportability in the development of graphics applications, according to Jerome Candelari, national sales director.

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Plenty of room for micros in CAD/CAM field

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — Users and vendors at the Siggraph '87 show here last week said there is room in the computer-aided design and manufacturing (CAD/CAM) field for both graphics workstations and personal computers with graphics capabilities.

As the price gap closes between low-end workstations and personal computers, users seeking workstation capability have a choice. But the workstation manufacturers say PCs have not taken any of their market.

Prime Computer, Inc. is expecting a 15% growth in its workstation sales area this year, according to Robert Fischer, president and chief executive officer of the company's CAD/CAM & Engineering/Scientific Group in Milford, Mass. "At this stage, we're expecting to do reasonably well this year, and next year should be even stronger," he said.

Not closing eyes

However, the workstation vendors are not closing their eyes to the increasing use of personal computers as workstations. "PCs play an important role in the technical environment. We know that," said Frank Casanova, a senior product manager at Chelmsford, Mass.-based Apollo Computer, Inc. But, he said, even PCs based on Intel Corp.'s 80386 chip lack graphics performance, networking capabilities and engineering applications software.

Additionally, PCs often need added memory boards and graphics boards to give them the power of a low-end workstation.

Benefits with the PC include the capability for personal computing and the use of the unit as a workstation.

User Kathy Wallace, a programmer at Lockheed Missiles & Space Co. in Palo Alto, Calif., said that for the money she had to spend on a workstation, a Tektronix, Inc. terminal was appealing. "But for the same money, I can get an IBM Personal Computer AT and software with Tektronix emulation," she said. "We can use the personal computer both as a workstation and for personal computing."

Wallace said that her division of Lockheed Corp. has a Digital Equipment Corp. VAX 8600. "We may buy a workstation to run off of the VAX or buy a DEC Microvax and a personal computer to work with it," she said.

Most conference attendees agreed that the choice of personal computer vs. workstation depends on the application that will be used on it.

Sandra Tasca, owner of Computer-Aided Photographs in San Marino, Calif., said she currently uses Autodesk, Inc.'s Autocad on an AT-compatible computer. "For my applications, the PC is powerful enough, but I'm not doing any three-dimensional work or shading. Both of those applications require much more power," she said.

Various studies have indicated that growth in the CAD/CAM tool market will be flat this year but may begin a gradual climb again next year. However, vendors polled at the show agreed that as the price of the workstation declines, more unit sales are needed to maintain the same dollar volume in sales.

CORRECTIONS

Because of a mechanical problem at the printer, pages 25-72 of the July 27 issue were incorrectly bound under the cover of the Spotlight pullout section in about half of the pressrun.

Tandon Corp.'s third fiscal quarter financial results [CW, July 27] reflected net income of $5.6 million, or 10 cents per share. The profit compared with a year-earlier loss of $20.3 million, or 39 cents per share. Third-quarter revenue was $81.8 million, a 58% increase over year-earlier sales of $51.8 million.

Tsotomu Ishii, of Tokyo, wrote the names of 44 countries on a single grain of rice.*

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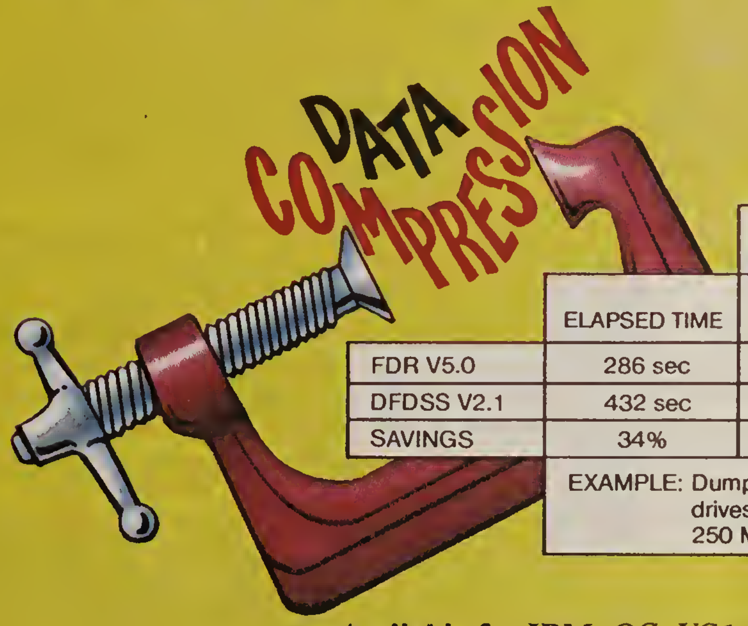

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DFDSS V2.1	432 sec	250.81 sec	20475	753	363
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Current users upbeat on DG outlook, but lost market share has taken toll

BY CLINTON WILDER
and DAVID BRIGHT
CW STAFF

Although current users of Data General Corp. computers are mostly optimistic about DG's ability to return to profitability and long-term stability, many former DG users and OEM customers have already switched their business to Digital Equipment Corp.

Interviews with members of the user and OEM communities confirmed the widely held view that part of DG's current financial malaise can be traced to market share lost to DEC in the past two years. But customers and Wall Street analysts generally said they believe DG's cost cutting and refocusing on OEMs and smaller user accounts is the right strategy for a financial turnaround.

Although most of its minicomputer rivals recently reported strong second quarters, Westboro, Mass.-based DG posted a $65.1 million loss and announced its third major layoff in two years.

Too good to fail

"I think they have too good a product base and too good a customer franchise to go under," said Bernard Weinstein, first vice-president of information systems and telecommunications at E. F. Hutton & Co. in New York, which runs many DG systems, including the high-end MV/20000. "What you're talking about here is a cyclical situation. People were writing their obituary a few years ago, too."

The recent strong quarterly performance of Wang Laboratories, Inc., another minicomputer maker that had been mired in a two-year slump, made some DG users hopeful for their vendor's turnaround.

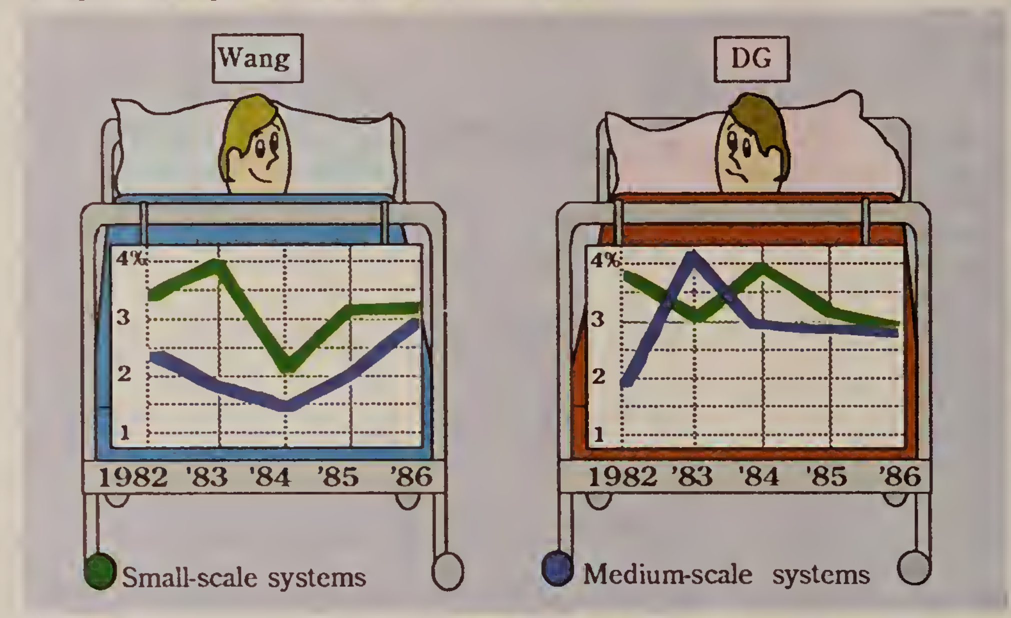
"We're going to stand pat," said John O'Rourke, assistant DP director at the New York office of Chicago-based Washington National Insurance Co. "It's a little frightening, but I know people who were involved with Wang, and they didn't budge at all because they were happy with the products. DG has always provided good support, and I don't see any dependability problems with future products."

Users were reassured about DG's commitment to research and development spending as the firm moved to slash costs in administrative and manufacturing areas. DG President Edson deCastro emphasized in a recent interview that the company will continue to increase R&D outlays.

"I like their strategy of sinking an awful lot of money into development," said Barry Graff, a former DG employee who is now DP manager at Thomas A. Greene & Co., a New York-based insurance firm.

Vital statistics

Comparison of worldwide market share in small and medium systems indicates Wang is showing improvement while DG continues to slip



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: AMY J. SWANSON

DEC's current boom has been the opposite of DG's financial woes. Some DG users, who requested anonymity, confirmed that they are converting to DEC VAX systems, although they stressed that DG's financial status was not a factor in the decision. One information systems manager cited the advantages of DEC's Decnet in linking nationwide offices to hub locations.

DG has also experienced defections to DEC among its mainstay OEM customers. According to deCastro, DG is now attempting to return to its core OEM business after its generally failed attempt to become a major force in Fortune 1,000 accounts.

"They've lost sight of that business," said Dick McCormick, marketing manager of Placentia, Calif.-based Intelligent Computer Integration, Inc., a vendor of hardware enhancement products for DG OEM customers. "They went after end users and found they were competing with their OEM customers," he added.

"Many of the value-added resellers have complained about a lack of support," said Wendell Watson, editor of *Database Monthly,* a DG users' magazine in Austin, Texas. "DG seems to be refocusing on OEMs and VARs and on the smaller user companies that used to be their bread and butter. Most users who I have talked to are confident that they will survive and be in for the long haul."

Others close to the company, however, remain skeptical. Doug Kaye, president of Rational Data Systems, a Corta Madera, Calif., vendor of DG communications software, said DG continues to lag in forming partnerships with niche experts.

"DG feels it has more market clout than it really does, hanging onto the not-invented-here syndrome," he said. "They started as a small company in a smaller industry, but there is no way DG or anyone else can provide everything today. The business has outgrown Data General."

AT&T bids

FROM PAGE 1

hensive networking system, according to Jeffrey Akers, a product manager with the company. "There is no difference between our devices' interface and the others', but we feel we have better capabilities of offering any combination of public, private or hybrid services," Akers said.

A key element of this strategy is the Dataphone II Acculink Network Management System, the first of several offerings that will increase corporate customers' control of both private and carrier-based networking facilities, the company claimed.

Future releases will converge AT&T's private and carrier-based network management systems, giving users the same ability to control and diagnose their public networks as they now have with their private networks, Akers said.

For example, AT&T is currently working on a dynamic version of its Customer Controlled Reconfiguration (CCR) offering, which would allow users to do real-time reallocation of bandwidth on their Accunet links. It takes AT&T up to 15 minutes to respond to a reallocation request via the existing CCR service.

In February Richard Snowden, director of AT&T's Concept Development Center, told *Computerworld* that dynamic CCR could be made available sometime in early 1988. But Akers would not comment because AT&T is now actively working toward a dynamic CCR tariff, and Federal Communications Commission regulations prohibit further talk of possible introduction dates, he said.

Lingering questions

TRW, Inc. is likely to pick NET or Timeplex over AT&T as its primary vendor for a planned private T1 network that will interface with the corporation's existing Accunet links. "We have questions as to whether AT&T can deliver the network management and control features it promises and whether its products can really leverage Accunet capabilities such as the future dynamic version of CCR," said Kenneth Jankowski, TRW's manager of network services.

One reason for this concern, he said, is the fact that AT&T did not develop the 745 multiplexer internally but is reselling a box developed by Tellabs, Inc. TRW purchased from AT&T a different T1 multiplexer developed by Tellabs and has found AT&T unable to service the box adequately, Jankowski said.

The Acculink Network Management Service software runs on an AT&T 3B2/400 minicomputer. It performs loop testing and other diagnostics for AT&T's Dataphone line of data service units and leased-line modems, generates statistical reports and routing tables and sets up and initializes T1 multiplexers, Akers said. AT&T has not ruled out the possibility of interfacing its network management system with IBM's Netview and Netview/PC products. But Akers said, "Right now, I don't see enough hardware and customers actually using those products to tell us what the true advantages of doing that are."

'Still a follower'

The announcement of the Dataphone II 745 Acculink puts AT&T on more equal footing with NET and Timeplex, Probe Research's Bernstein said. "It was a move AT&T had to make," he noted. "The bulk of customers are becoming T1 backboned, so AT&T had to have a legitimate product line." However, Bernstein emphasized, "AT&T is still a follower, not a leader" in the T1 equipment market.

AT&T also announced the BCM 32000 Solitaire Multiplexer, which uses bit compression to allow a T1 link to support twice the usual number of 64K bit/sec. channels. The Solitaire conforms to the Adaptive Differential Pulse Code Modulation industry bit-compression standard. The product is available now and is priced at $6,500, approximately 60% less than AT&T's current bit-compression multiplexer, the firm said.

The Dataphone II 745 Acculink multiplexer is scheduled to be generally available by mid-September, priced between $10,000 and $68,000, depending on configuration.

The Acculink Network Management System, priced at $49,000, will be generally available in October or November, the company said.

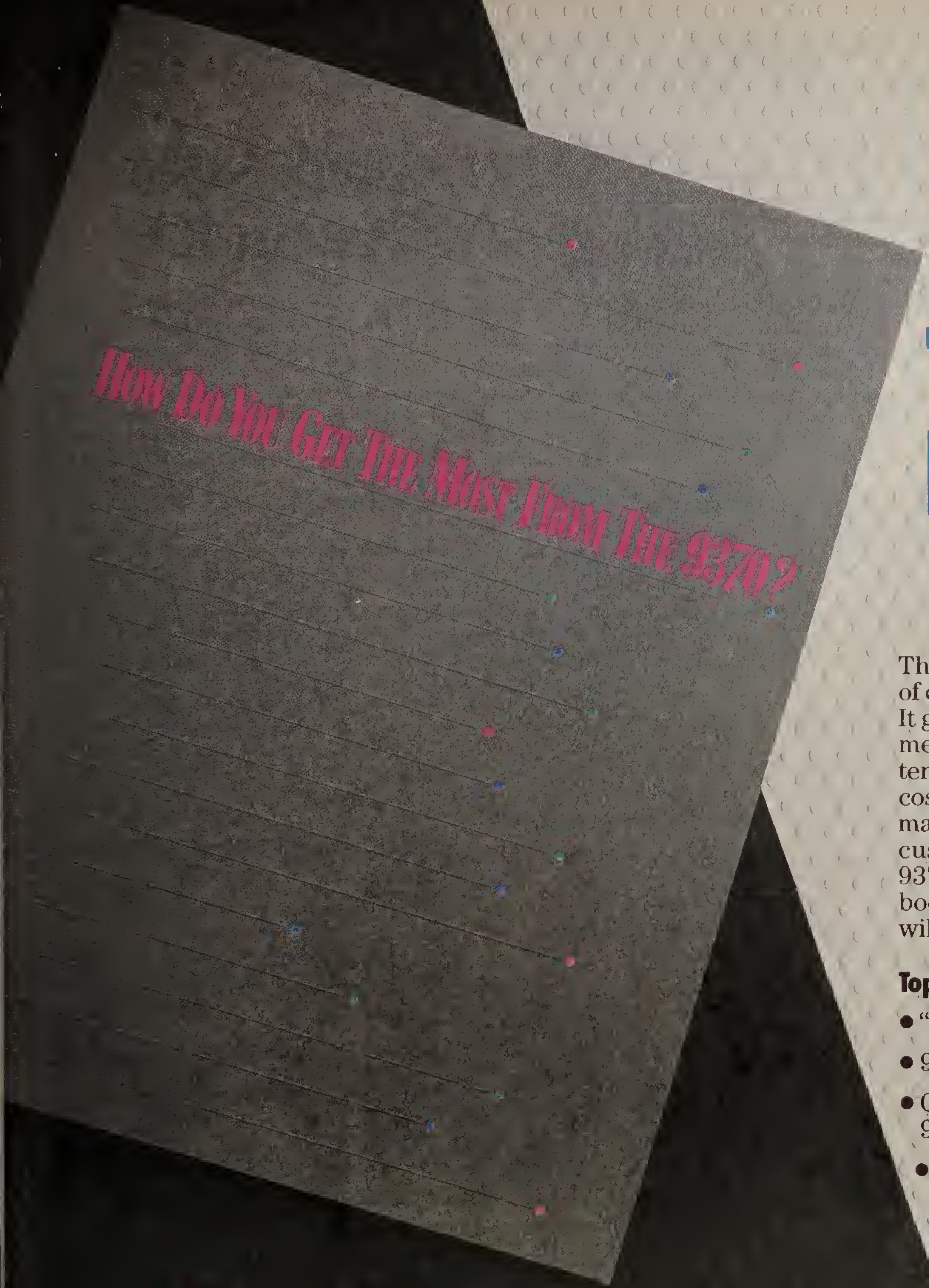
Honeywell Bull squeaks out $1.8M profit in first quarter

MINNEAPOLIS — Honeywell Bull, Inc. last week announced a $1.8 million profit in its first quarter of operations as a joint venture of Honeywell, Inc., Compagnie des Machines Bull and NEC Corp.

Honeywell Bull reported revenue of $508.2 million for the three months ended June 28. It said the operations now constituting Honeywell Bull had revenue of $424 million under their former parent companies in the first quarter of the year.

In a statement, President and Chief Executive Officer Jerome J. Meyer said the firm had strong revenue internationally, but would be concentrating on "improving long-term performance in the domestic market."

Honeywell Bull announced separately that it has reorganized several divisions along domestic or international rather than functional lines. U.S. marketing, planning, sales and service organizations will report to Executive Vice-President John C. Butler. Domestic marketing and planning had previously been grouped with overseas sales and marketing.



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Junior PS/2

FROM PAGE 1

720K-byte 3½-in. floppy disk drive and 512K bytes of random-access memory. Dealer cost for this unit will reportedly be as low as $810. A second floppy disk drive will sell for $170.

The $1,750 Model 25-004 differs from the monochrome unit only by the inclusion of a 12-in. color analog monitor. Dealer cost will be as low as $1,050.

The color monitor takes advantage of the Multiple Color Graphics Adapter, a high-resolution graphics mode introduced with the PS/2 Model 30.

Just the ticket

For one user, an inexpensive IBM Personal Computer may be just the ticket.

"We really see a need to network, but it can be so expensive that we can't justify it. If they [IBM] come up with an inexpensive machine that works with the Token-Ring and runs our applications, such as Lotus Development Corp.'s 1-2-3, we would be very interested," said Paul H. D'Anna, senior staff computer systems analyst for Mobil Corp. in New Orleans.

D'Anna said he would not be deterred by the machine's lack of a hard disk. "As a station on a network, you use very little hard disk. You pull all the data into memory. We could have a large data base on a server, and the Model 25 could use the data," D'Anna said.

The Model 25 is a totally new design for IBM. Unlike other models within the PS/2 line, which have a separate monitor, CPU and keyboard, the Model 25 houses the monitor and the CPU within the same chassis. Unlike the PS/2 Models 50, 60 and 80, the Model 25 does not use the Micro Channel, a new bus architecture that is incompatible with IBM's previous line of PCs.

With many dealers willing to cut margins to boost sales, store prices of the machines should be highly aggressive. Dealers have slashed prices of the Model 30 from its $1,695 list price to less than $1,200.

Portability featured

The machine, which weighs 28 pounds in its monochrome configuration, was designed to be easily moved and offers a carrying case as an option.

In addition, the machine has a small footprint and is approximately 12 in. wide, 15 in. tall and 14 in. deep. This form factor makes the machine similar in size to Apple Computer, Inc.'s Macintosh.

Standard features on the Model 25 include an asynchronous communications adapter, a socket for an Intel 8087-2 math coprocessor, a parallel printer port, a serial port, a pointing-device port and an expansion riser with two slots: one full-length and one three-quarters the size.

To boost the positioning of the machine as a network product, the Model 25 is compatible with a slew of IBM network cards, including the PC Network Adapter and the Token-Ring network. The Model 25 also supports various System/36- and 38-oriented communications software products, including IBM's PC Support/36 and PC Support/38.

More than 50 business software packages, including Lotus's 1-2-3 and Novell, Inc.'s Advanced Netware network operating system, will reportedly be available for the Model 25 in the 3½-in. medium. •

In addition to being configured for network uses, the Model 25 is said to be adequate for the lower tier of computer users within corporations, who primarily do word processing or use the machines only occasionally. Low-end Intel 8088 and 8086 machines, such as Tandy Corp.'s Model 1000 line and the Leading Edge Products, Inc. Model D, have made some strides in this market.

"If you are talking about a machine where all that is needed is word processing, that is a good market," said a large user familiar with the Model 25. The source added that if the Model 25 receives discounts as steep as those on the Model 30, it would appeal to a large number of users.

Cost-effective power

For one large corporate user, low-end machines already play a key role by providing computing power in a cost-effective manner. "For people less computer literate, we are using Tandy 1000s. It is very adequate for those applications where the use is occasional and largely oriented toward word processing," said a vice-president in a Fortune 500 company.

This user has also moved toward tying inexpensive machines into LANs.

On account of its industry-standard processor and older bus architecture, the Model 25 should be a highly compatible machine.

IBM literature claims the machine is compatible with the PS/2 Model 30, the older IBM PC and PC XT at the BIOS level and "most hardware interfaces."

Chicago rings in AT&T long-distance switch

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Cap'n Crunch did it. An 800-number promotional advertisement for the breakfast cereal caused the Chicago 7 long-distance 4ESS switch here to reach its capacity of 700,000 calls per hour in late 1985. It was then that AT&T decided that the 1976-vintage switch would need help, but it was just last weekend that AT&T brought a new switch, Chicago 9, on-line.

Together, the two switches will be able to handle 6.85 million calls per day. They are the only switches that handle long-distance phone calls into and out of downtown Chicago. But the Chicago 7, the first 4ESS installed in the world, will continue to carry the greatest burden, chugging along at 5.1 million calls per day.

"The Chicago 7 kept outperforming the engineers' estimates of its capacity," reported Michael F. Kelly Jr., who supervises Chicago 7 operations. "But when it hit 717,000 calls an hour on Thanksgiving weekend of 1985, we decided we would need to have a new switch."

AT&T spokesmen said that the extra capacity was required by the demand for new services, such as AT&T Megacom, a large-volume calling service with call-management features, teleconferencing and 800- and 900-number services. At first, Chicago 9 will be performing at a fraction of its capacity, which matches the Chicago 7's limit of 700,000 calls per hour.

Technology has greatly changed the design of AT&T's long-distance 4ESS switches. The Chicago 9 switch is housed on one-third of a floor in one of AT&T's downtown Chicago buildings. By contrast, the Chicago 7 is housed in two full floors of the same building. The new machine uses plastic panels and silicon chips to do what the older machine does largely with hard-wired circuits. As a result, the cooling requirements for the new switch are far less than those for the Chicago 7, which has in the past heated its floor space to 90 degrees or more. The Chicago 9 was assembled in eight months, while the Chicago 7 took two years to construct.

The two switches are fully redundant in the event that one breaks down. Special acid-driven plastic batteries called Bellcells could drive the switches for up to three hours, while auxiliary diesel generators could run them indefinitely in case of a Chicago power failure. The added capacity should carry Chicago's business district for years to come, if past experience — barring cereal promotions — is any indication. Since January 1976, the Chicago 7 has switched an estimated seven billion long-distance calls.

Cray revamps supers, goes with static RAM

BY JAMES CONNOLLY
CW STAFF

MINNEAPOLIS — Cray Research, Inc. last week revamped its Cray-2 line of supercomputers with memory technology designed to help users with memory-intensive applications such as those dealing with fluid and gas dynamics.

Cray, which claimed an installed base of eight of the Cray-2 systems introduced in 1985, also predicted four more installations by the end of this year. Cray replaced two Cray-2 models with three systems. The new models utilize static random-access memory (RAM), which the company said provides an average throughput gain of 25% in comparison with models using dynamic RAM.

According to a Cray spokesman, the static RAM chips feature an access time of 55 nsec, while dynamic RAM chips have an access time of 120 nsec. Static RAM chips maintain a constant flow of electricity to provide for faster operations than dynamic RAM chips, which must be refreshed repeatedly.

The static RAM chips were designed to reduce memory contention, which the spokesman said can mean a 40% throughput advantage for memory-intensive applications running on a Cray-2S with 1G byte of static RAM, compared with a Cray-2 with 2G bytes of dynamic RAM.

Analyst Gary Smaby, managing director of technology research for Minneapolis brokerage house Piper, Jaffray & Hopwood, Inc., said, "From a user perspective, [a group] like NASA has to be delighted with this. They are so memory-hungry that they will take all of the memory they can get."

Smaby noted that the lack of a field upgrade from the original Cray-2s to the Cray-2S models is unlikely to upset existing Cray-2 users, because Cray made its plans known almost a year ago. He also said Cray is likely to offer its best customers other benefits if those customers are unable to take advantage of the static RAM technology immediately.

Analyst Marcia Brooks of Framingham, Mass.-based market research firm International Data Corp. added that Cray's moves may be a result of the company's desire to improve its overall price/performance ratio. "They obviously are beginning to meet some pretty serious competition from other sources," she said, noting that minisupercomputer vendors and parallel system makers have not directly impacted the Cray-2 market, but that Cray's traditional customers are starting to recognize that alternatives exist.

In introducing three models for delivery in early 1988, Cray discontinued the dynamic RAM-based Cray-2/4-128 and Cray-2/2-128, which use four and two CPUs, respectively, and feature 128M words or 1G byte of memory. Cray replaced those versions with static RAM models and added the Cray-2S/2-64 with 64M words of memory. The Cray-2S/4-128 costs $17.5 million, the Cray-2S/2-128 costs $15.5 million and the Cray-2S/2-64 costs $12 million.

The one remaining dynamic RAM model, the Cray-2/4-256, which previously was the high-end system, was reduced from $17 million to $15.5 million.

With an average performance gain of 25%, the peak rating for a Cray-2S reportedly is 2.2 million floating-point operations per second (MFLOPS), compared with 1.8 MFLOPS for the earlier models.

Cray also announced on-line tape support for Cray-2 systems through the Cray Tape Controller, which allows direct connection of 32 IBM 3480 devices.

In addition, the company cut prices by up to 20% for its SSD solid-state storage devices.

Static lineup

Cray's new 2S model systems join forces with the older Cray-2/4

	Processors	*Memory capacity (in bytes)*	*Memory type*	*Price*
Cray-2S/4-128	4	1G	Static RAM*	$17.5M
Cray-2S/2-128	2	1G	Static RAM	$15.5M
Cray-2S/2-64	2	512M	Static RAM	$12M
Cray-2/4-256	4	2G	Dynamic RAM	$15.5M

*Random-access memory

CW CHART

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Feds name CFO to clear system disarray

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. government's executive branch, which has been widely criticized for inadequate and incompatible financial management systems, recently appointed a chief financial officer to clean up the mess.

The government's first CFO, Gerald R. Riso, is expected to "bring the best of contemporary technology and practice to federal financial operations," according to James C. Miller III, director of the Office of Management and Budget (OMB).

Riso, associate director of the OMB for management, will oversee an ambitious reform program to consolidate 124 existing financial systems into a single governmentwide information system and to modernize antiquated accounting systems, the OMB announced.

According to testimony at hearings of the Senate Governmental Affairs Committee, there are at least 400 different accounting systems in the executive branch, and no two systems are exactly the same.

"We also know that many of these systems are broken, that some are incapable of producing reliable, consistent information," said Sen. John Glenn (D-Ohio), chairman of the committee. "We cannot tell, for example, what the impact of Gramm-Rudman-Hollings [budget-cutting legislation] has been because agencies do not use the same definitions of programmatic or administrative cost."

Government auditors found that "we have lost millions in public funds because of inadequate fund control, poor collection systems, costly custom-built upgrade efforts and missing data," Glenn said.

"Billions of dollars are being spent on uncoordinated efforts to upgrade accounting and financial management systems, but these efforts have routinely failed to meet their objectives," testified Charles A. Bowsher, head of the U.S. General Accounting Office.

Bowsher also expressed concern "about our continued reliance on antiquated systems that do not provide the information required for effective management" of federal programs and budgets.

Crosses party lines

The idea of establishing the CFO position for the federal government has bipartisan support, but Glenn and Bowsher argued that the CFO should be an executive in the U.S. Department of the Treasury, not at the OMB.

They asserted that the OMB has not dedicated enough staff or resources to financial oversight, is plagued by frequent management turnover and lacks clout among Cabinet departments. But OMB officials said the OMB has plenty of clout because it controls agency budgets.

The appointment of the CFO was announced July 23, one day after Sens. Glenn and William V. Roth Jr. (R-Del.) introduced a bill that would have established the CFO post at the Treasury Department.

Riso has held several management positions in the federal government, most recently as assistant secretary of the U.S. Department of Interior for Policy, Budget and Administration.

Imagen hat in Postscript ring

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Imagen Corp. last week said it plans to offer compatibility with Adobe Systems, Inc.'s Postscript page-description language for its existing line of laser printers.

Through a software upgrade scheduled for release in March 1988, the company's Imageserver XP laser printers will be able to print Postscript files and support Imagen's proprietary page- and document-description languages, the vendor said.

Imagen is offering Postscript compatibility with its own version of the Postscript printer control driver. "Our market has been crying out for Postscript compatibility," said Frank Lassman, vice-president of marketing and sales. "Postscript, because it has become a language standard, is in the public domain. We also didn't need to license the Adobe driver; we made our own."

All 35 Postscript fonts are scheduled to be supported through the use of both Imagen's proprietary fonts and font outlines licensed from foundries such as Linotype Corp.

Postscript compatibility — as opposed to direct licensing from Adobe — is becoming more common among laser printer companies that prefer to skip the royalty payments and the licensing waiting period, according to Ed Wong, an electronics publishing analyst at Dataquest, Inc. in San Jose, Calif. The quality of Postscript-compatible font reproduction, however, can vary from vendor to vendor.

Pricing for the Postscript compatibility software has not been announced.

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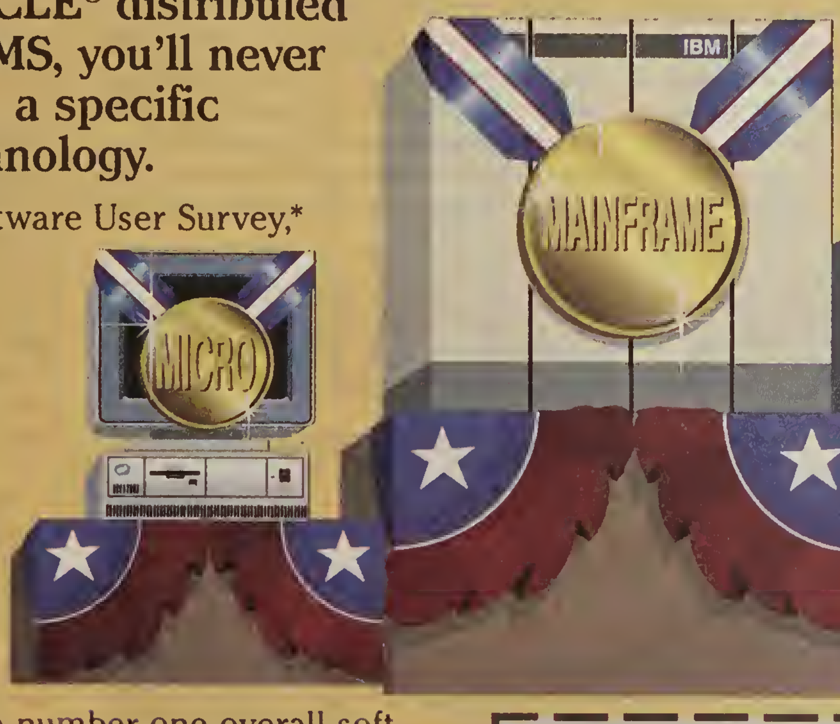

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AZ	Phoenix	Jul 14, Aug 27, Sep 24
	Tucson	Aug 26
CA	Lafayette	Jul 30, Sep 24
	Los Angeles	Jul 16, Aug 13, Sep 8, Sep 30
	Newport Beach	Jul 21, Sep 17
	Sacramento	Aug 13
	San Diego	Jul 30, Sep 10
	San Francisco	Jul 21, Aug 18, Sep 15
	San Jose	Jul 9, Aug 6, Sep 2
CO	Colorado Springs	Jul 16, Sep 17
	Denver	Jul 14, Aug 13, Sep 15
CT	Hartford (Farmington)	Jul 23
	New Haven	Jul 28
DE	Wilmington	Jul 9, Sep 1
FL	Ft. Lauderdale	Jul 16
	Jacksonville	Sep 9
	Orlando	Jul 15
	Tampa	Sep 10
GA	Atlanta	Jul 8, Sep 16
	Macon	Aug 13
HI	Honolulu	Sep 17
IA	Des Moines	Jul 15, Sep 17
IL	Chicago	Jul 14, Aug 19, Sep 15
	Springfield	Aug 11
IN	Indianapolis	Jul 21, Aug 12, Sep 24
KS	Wichita	Aug 4
KY	Louisville	Sep 10
LA	Baton Rouge	Jul 23
	New Orleans	Aug 21
MA	Boston	Jul 16, Aug 25, Sep 10
	Burlington	Sep 30
	Springfield	Sep 16
	Worcester	Aug 5
MD	Baltimore	Jul 28, Sep 3
	Bethesda	Jul 28, Aug 6, Sep 8
MI	Detroit	Jul 14, Aug 11, Sep 15
	Grand Rapids	Jul 8
	Traverse City	Jul 28
MN	Minneapolis	Jul 28, Aug 26, Sep 29
MO	Kansas City	Jul 23, Sep 22
	St. Louis	Jul 16, Aug 18, Sep 16
NC	Charlotte	Jul 22, Sep 23
	Raleigh	Jul 15, Sep 16
	Winston-Salem	Aug 12
NE	Omaha	Jul 9
NH	Manchester	Aug 27
	Nashua	Aug 13
NJ	Cherry Hill	Jul 30, Sep 9
	Iselin	Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29
	Princeton	Jul 9, Aug 12, Sep 22
NM	Albuquerque	Jul 7, Sep 22
NV	Las Vegas	Jul 9, Sep 9
NY	Albany	Jul 14
	Buffalo	Aug 6, Sep 29
	Long Island	Sep 15
	New York City	Jul 8, Jul 16, Jul 22, Jul 29, Aug 6, Aug 13, Aug 19, Sep 9, Sep 17, Sep 23
	Rochester	Jul 30, Aug 20, Sep 22
	Syracuse	Jul 7
OH	Cincinnati	Aug 5
	Cleveland	Jul 16, Aug 13, Sep 17
	Columbus	Aug 4, Sep 30
	Dayton	Jul 21, Aug 18, Sep 22
OK	Oklahoma City	Jul 21, Sep 15
	Tulsa	Aug 11
OR	Portland	Jul 21
PA	Harrisburg	Aug 4, Sep 15
	King of Prussia	Jul 16, Sep 17
	Philadelphia	Jul 9, Aug 6, Sep 10
	Pittsburgh	Sep 8
RI	Province	Jul 8
SC	Charleston	Aug 12
TN	Memphis	Jul 29
	Nashville	Aug 6
TX	Austin	Aug 12
	Dallas	Jul 14, Sep 9
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	Lubbock	Aug 4
	San Antonio	Aug 13
UT	Salt Lake City	Jul 28, Sep 29
VA	Norfolk	Jul 14
	Richmond	Jul 8, Sep 8
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VT	Burlington	Sep 2
WA	Seattle	Aug 6, Sep 3
WI	Green Bay	Aug 10
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	Milwaukee	Jul 22, Sep 3

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Computer Associates' size worries some

Critics say better support not compatible with growth; acquired customers see improvement

BY ALAN ALPER
CW STAFF

ORLANDO, Fla. — Computer Associates International, Inc.'s dramatic growth through acquisition is seen as a mixed blessing by many of its customers, who remain unconvinced that the firm can improve its spotty service-and-support track record while absorbing a larger installed base.

For many users at the company's second annual users conference here last week, service and support were primary issues. Almost two months ago, Computer Associates disclosed its intention to acquire archrival Uccel Corp., which would create the industry's largest independent software vendor [CW, June 8].

"It's definitely going to be tougher for them to support a larger amount of customers," noted Mile Pallone, manager of product control for American Express Co.'s Traveler's Cheque division in Salt Lake City.

Computer Associates should not acquire any more companies until it better supports what it already owns, said Don Dameron, a data center manager at Eastern Michigan University in Ypsilanti, Mich. "With all the users they've acquired, they haven't proven they can support them yet," he added.

But some customers who Computer Associates inherited from the small companies it acquired, such as Value Software, Inc. and Johnson Systems, Inc., are convinced that Computer Associates' level of support is vastly superior to what they were accustomed to.

Computer Associates' "support has surpassed the support of many of the companies it acquired," said Mike Landolt, a programmer/analyst with Abbott Laboratories in Abbott Park, Ill.

Computer Associates executives at the users conference said they could not discuss the ramifications of the Uccel purchase because of an ongoing investigation by the U.S. Department of Justice, which must approve the acquisition. Computer Associates said it still expects the acquisition to be completed by the middle of this month.

Attaining the personal touch

Customers of both Computer Associates and Uccel said that if the acquisition goes through, perhaps the most important thing Computer Associates would gain from its Dallas competitor is Uccel's superior service and support methodology. Uccel is noted for being responsive to user needs and providing a more personal touch than its competitors, users have said.

Kevin Jones, assistant vice-president of data processing for Eastern States Bank Association, a credit card processing firm in Lake Success, N.Y., is a customer of both Computer Associates and Uccel. While Jones lauds Uccel's responsiveness to his problems, he remains unconvinced of Computer Associates' claimed improvement in customer support and service.

"They're not very responsive to our problems," he said of Computer Associates. "We have to make multiple phone calls to get things resolved."

One of the problems with Computer Associates' support and service, claimed Jerry Powell, data center manager at Burroughs Wellcome Co. in Greensville, N.C., is that many of its service and support staff are not qualified to do the job. Powell said Burroughs Wellcome has dealt with an array of faces, and each service call has become a tutorial in the firm's data center environment. He said he believes Computer Associates is not providing its service and support staff with the incentive to stay with the firm.

David Tory, senior vice-president of planning, said Computer Associates has made tremendous strides in improving support and service, but customers' expectations always exceed vendor capabilities. "The problem is that the company is growing so rapidly and has broadened its product line and customer base so quickly," Tory said. "It's a relative thing; it's something we're constantly trying to improve."

Tory pointed to CA-Unicenter — its full complement of data center software products and services — as an example of the firm's expanded effort to meet its customers' support needs.

The company is creating a data base containing customer profiles of all CA-Unicenter users. It provides Computer Associates' service staff with a listing of each user's computing environment, software products installed and release level, among other things.

As product sophistication and integrated functionality increase, Computer Associates will lean more heavily on automated tools and services to better support its customers, Tory said. "It will not replace manual services," he said. "We will also add consulting services, training and education, which will aid in the use of our products."

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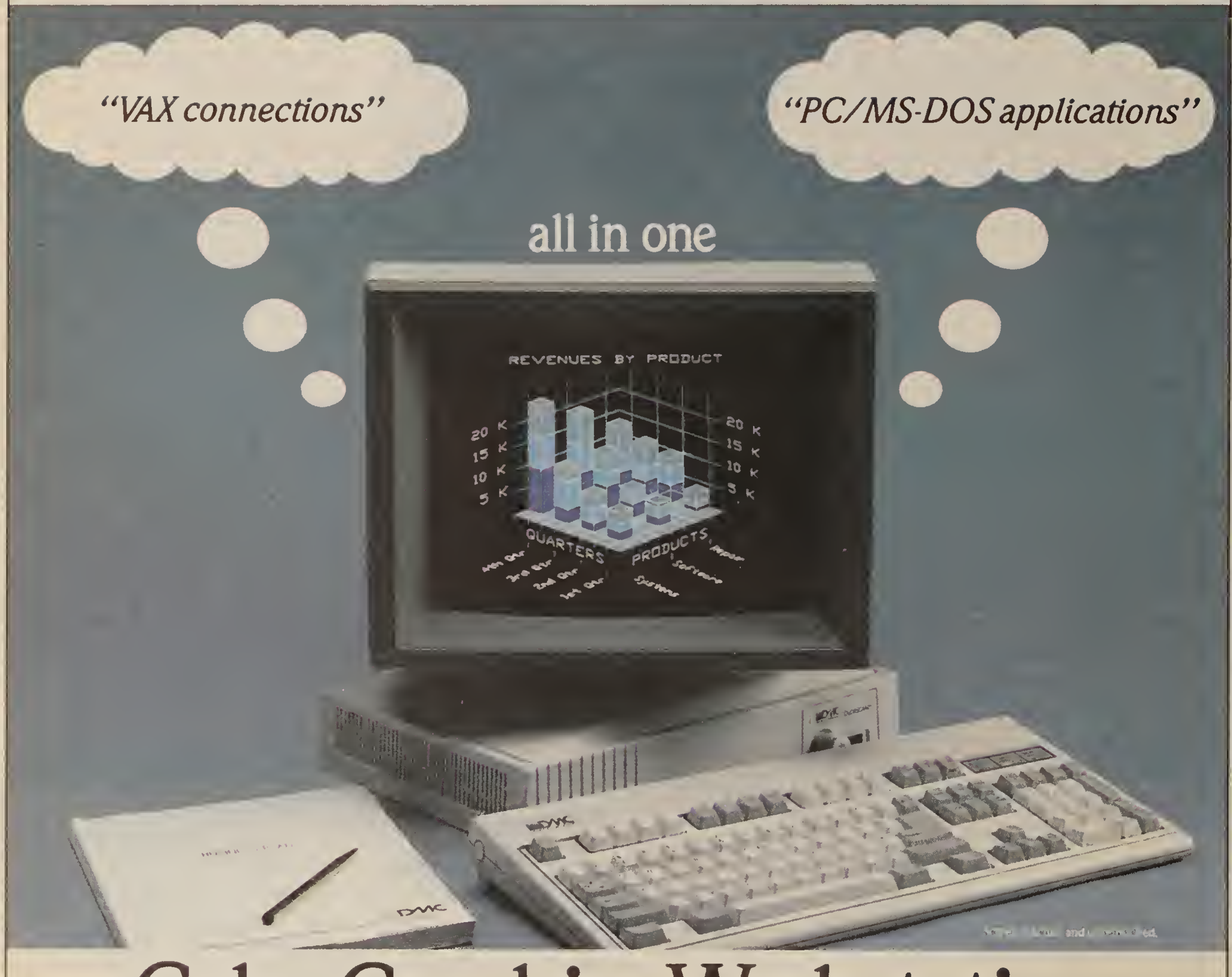

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Computer Associates adds to data center tools

BY ALAN ALPER
CW STAFF

ORLANDO, Fla. — Computer Associates International, Inc. last week introduced an automated console-management tool and a package to manage multiple sessions under VTAM.

During its users conference here, the Garden City, N.Y., firm unveiled CA-Opera, which is said to use expert systems technology to help computer operators handle the massive number of exception messages transmitted by large-scale MVS-based IBM mainframes. The product was co-developed with Baxter Travenol Laboratories, Inc.

Current IBM 3080, 3090 and compatible mainframes transmit exception messages at a rate of four to six messages per second longer, which is humanly impossible for computer operators to handle, said Bill Buer, CA-Opera product manager. With previous mainframe generations, operators would receive a message every 30 seconds, he said.

Operators' input aids design

CA-Opera aids operators by filtering out the messages that are noncritical, providing advice on those that are critical and, in some cases, implementing fixes without operator intervention, Buer said. Computer Associates developed the product by interviewing Baxter Travenol operators and subsequently used the pharmaceuticals firm's McGraw Park, Ill., data center as a test environment. Baxter Travenol funded the project.

"With the starter knowledge base that we provide, about 20% to 30% of the console messages an operator sees are eliminated," Buer said. Customers can add to and customize the starter knowledge base depending on the requirements of their individual shops, Buer noted.

Currently shipping, CA-Opera lists for $17,700. The product competes with a variety of other console-management products, including Uccel Corp.'s Operator.

Computer Associates' multiple VTAM session manager, called CA-VMAN, provides additional security for companies that want to better control user access to particular applications on their IBM MVS-based mainframes via VTAM, noted Mike Bunting, CA-VMAN product manager.

With CA-VMAN, users log on to their systems and must go through the session manager to access VTAM. They then go into a security system, such as the vendor's CA-Top Secret, to get their application.

CA-VMAN was developed using a shell created by Unisoftware, Inc. in Maple Shade, N.J. It will compete with Duquesne Systems, Inc.'s TPX and Cincom Systems, Inc.'s Netmaster, Bunting said. Priced at $12,600, CA-VMAN is already shipping, he added.

Sequent stalls Symmetry arrival

BY STANLEY GIBSON
CW STAFF

Sequent Computer Systems, Inc. will ship its Symmetry parallel processing system two months late, and a crucial cache system will not be available until five months after initial shipments, the company said last week.

The Symmetry system is based on multiple Intel Corp. 80386 microprocessors and was announced in May for September delivery. "The copy-back cache is not ready," said Casey Powell, president of the Beaverton, Ore., company. Machines shipped in November will not have the feature, which will be added in April 1988, he said.

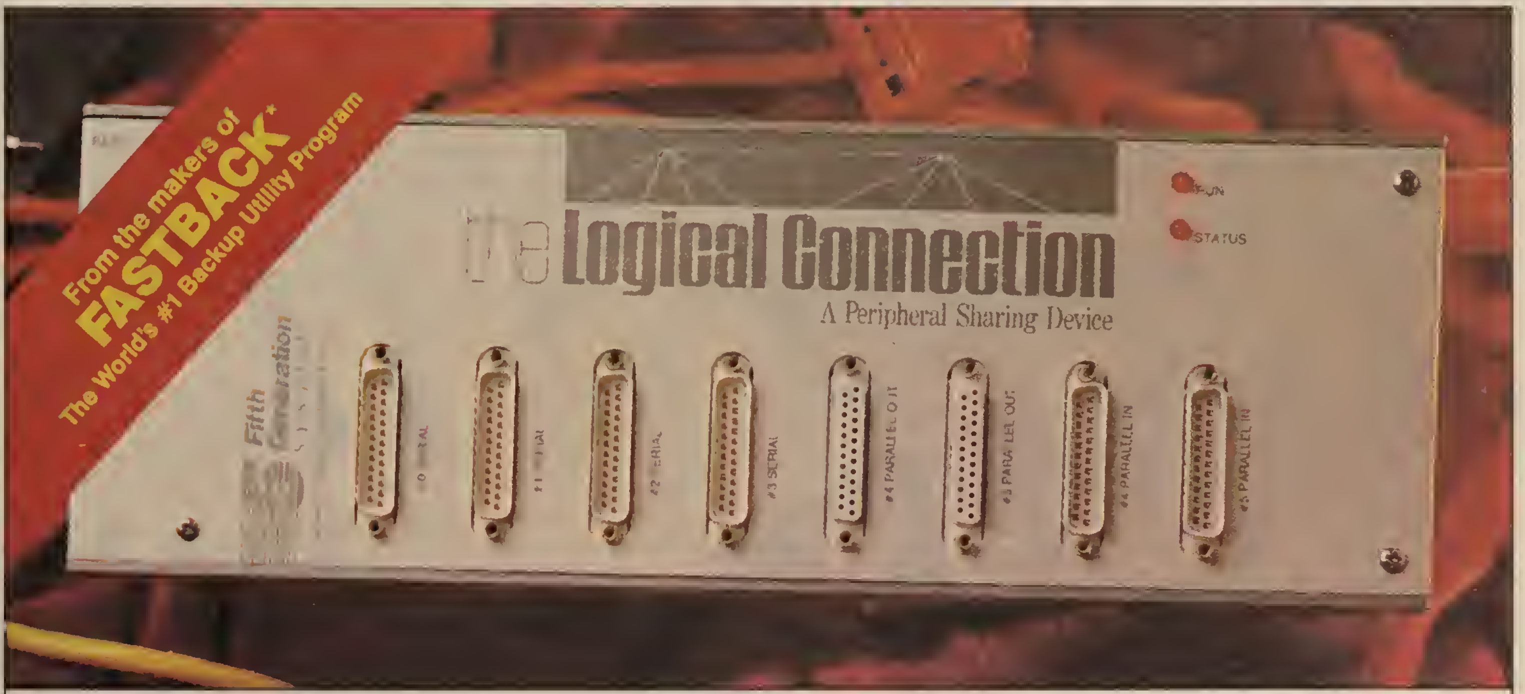
The cache feature is responsible for enabling the 80386 chips to perform at 4 million instructions per second (MIPS). Without the feature, chips in the system can perform at only 3 MIPS, Powell said. In addition, the maximum-size CPU can include only 10 processors, instead of the previously projected maximum of 30 processors.

However, Powell said the delay will not affect the number of systems shipped. He explained that the company will ship no more than 10 Symmetry systems before April, even though he claimed to have no shortage of orders. He said the price of the system will remain the same and will not be reduced or billed in two parts to correspond with the scheduled upgrade.

"That is one of the advantages of Sequent's architecture — that it can be upgraded," offered Jeff Canin, an analyst at Hambrecht & Quist, Inc. "I don't look at it as a setback. No other competitor has an installed base as large as theirs."

"The risk in 'fessing to this [delay] is that people will say we've got problems," Powell said. But he added that it was better to make such an announcement than to risk customer disaffection if the computer could not perform properly.

Looking ahead, Powell said Sequent is considering using the National Semiconductor Corp. 32532 processor in future systems, which reportedly will be able to perform at 8 to 10 MIPS and may be announced in the fourth quarter.



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MAP gassed up and rolling

GM showcases pilot shop; full-scale use predicted by early '90s

BY JEAN S. BOZMAN
CW STAFF

PONTIAC, Mich. — Demonstrating the fruits of its seven-year involvement with the Manufacturing Automation Protocol (MAP), General Motors Corp. last week showcased its pilot automated production facilities and detailed plans for full-scale implementation.

Three of GM's plants have been using MAP 2.1 since December and are relying exclusively on MAP as the basis of broadband 10M bit/sec. backbone networks.

Plants here and in Oshawa, Ontario, were gutted in 1985 to be reconfigured for the automated system, while a new Fort Wayne, Ind., plant was designed to accommodate MAP.

"This is the first large-scale, plantwide productive installation of MAP 2.1," said Ernest Vahala, director of manufacturing engineering operations for GM's Truck & Bus Group. GM said it now plans to implement MAP in 30 U.S. plants during the next two years and in all of the company's 165 manufacturing facilities worldwide by the early 1990s.

Trade-offs along the way

There have been some trade-offs along the way, according to Vahala and Frank Palopoli, plant manager of the Pontiac East site. One important trade-off is that testing conditions prevent the Pontiac East plant from running at three full shifts.

The plant currently produces 432 trucks per day in a single shift. It plans to expand soon to two shifts, for an 800-truck capacity, but will not add a third shift for some time. "We need the third shift to check that everything in the system is working correctly," Palopoli said last week.

Another important lesson learned during the MAP conversion is that the broadband network that broadcasts MAP data at 10M bit/sec. has to be fine-tuned and carefully maintained. "Our task was not just justifying MAP," Vahala said. "It was justifying the integration of the whole plant.

"We have found that our broadband implementation is extremely flexible and a beautiful way to go but that you need to have a maintenance program to run along with it," Vahala said.

Nuts and bolts of the operation

Driving the automated systems at the Pontiac East plant are four clustered Digital Equipment Corp. VAX 8600s, which direct 25 Hewlett-Packard Co. cell controllers throughout the 2.4 million-sq-ft plant. The cell controllers are based on HP 1000 Model A900 computers, said Paul Hansen, a business development manager from HP's Data Systems Division.

Down-line there are 800 devices, including 350 programmable logic controllers and 143 robots for welding and painting.

GM engineers specified the tasks for each cell controller and work area, but it was systems engineers from Electronic Data Systems Corp. (EDS), a GM subsidiary, who acted as systems integrators, combining the DEC, HP and controller equipment. GM spokesmen said more than 100 EDS systems engineers and 40 additional engineers from GM Hughes Electronics were involved in the project.

Key MAP element

One key element of the integration was provided by Industrial Networking, Inc. in Santa Clara, Calif., a joint venture formed between Ungermann-Bass, Inc. and General Electric Co. The Industrial Networking boxes handle the physical level of MAP.

In addition, Industrial Networking wrote an interface to MAP called MAP Application Software, which acts as a buffer between the customer's application and the MAP 2.1 software.

When MAP 3.0 becomes available next June, the MAP Application Software interface will allow the GM plants to change over seamlessly from MAP 2.1 to MAP 3.0, according to Joe Schoendorf, president of Industrial Networking.

MAP 'overhyped' until now

Until recently, MAP has been overplayed, Schoendorf said.

"The expectations about MAP were way too high, and it was overhyped. Now, we have several real examples of MAP at work in a real-time factory environment, and we can say that MAP 2.1 is real," Schoendorf said.

The road to MAP has been a long one, GM executives conceded.

"Pontiac East demonstrates the results of a GM MAP task force formed seven years ago to identify a communications standard for multivendor communications in a high-volume factory environment," said Charles Katko, vice-president and group executive of the Truck & Bus Group.

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NAS joins Sun to co-develop Unix system

BY ROSEMARY HAMILTON
CW STAFF

SANTA CLARA, Calif. — With its eye on the scientific and engineering market, National Advanced Systems Corp. (NAS) struck a deal last week to jointly develop a version of Sun Microsystems, Inc.'s Unix-based operating system for the NAS line of IBM plug-compatible mainframes.

NAS and Sun will tailor the SunOS operating system to the mainframe environment, as well as the Sun Network File System and other communications software, the companies said.

The new operating system is not expected to be available until 1989 at the earliest. While no specific release date was given, Mary Ahrens, NAS's director of strategic alliances, said the development "will take some time — at least 18 months to two years."

While SunOS will be redesigned for the mainframe environment, it will be able to run existing third-party applications designed for the current Sun operating system, both companies said.

NAS has been constructing plans for months to boost its standing in the technical computing market. Currently, 15% to 20% of its installed base is in engineering environments, according to Ahrens.

Earlier this year, the company established an engineering and scientific group, which is based in Atlanta. According to industry analyst Robert Djurdjevic, NAS will continue to "build relationships with companies that already have a presence in this market." Djurdjevic, who is president of Annex Research, said NAS has identified 60 companies that "it may try to work something with."

Expanding Sun's reach

Meanwhile, the agreement will also expand the Sun environment to the mainframe arena. "This allows us to gain exposure in marketplaces that aren't currently available to us," said a Sun spokeswoman. "NAS is strong in vertical markets, like hospitals."

The Sun operating system will provide NAS with a Unix offering that can run as a native operating system on its plug-compatibles. Currently, both the IBM Unix offering, IX/370, and the Amdahl Corp. offering, UTS, can run on NAS hardware, but they must run as guests under the IBM VM operating system.

"When you run under VM, there's a lot more overhead, so the performance is just not as good as you get in native mode," Ahrens said.

When forming its plans for a Unix offering, NAS reviewed the options of developing one itself or teaming up with another vendor, Ahrens said. An NAS development effort was ruled out because it would have taken "at least twice if not three times as long" as the Sun project, Ahrens said.

Other currently available Unix offerings were reviewed in addition to SunOS, she added. However, NAS decided they "took a proprietary approach," Ahrens said.

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ADR repeals Adroit sale

Forms new division to breathe life back into system

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) last week disclosed it has decided not to sell its computer-based training system, Adroit, and instead has formed a separate division to handle product sales, marketing and development activities.

Earlier this year, ADR placed Adroit on the block because it said the system did not fit into its product line of programming languages, programmer productivity tools and relational data base management systems [CW, March 30]. Adroit, an interactive training system that operates on IBM Personal Computers and compatibles, has an installed base of about 125, ADR said.

Since deciding to sell Adroit, ADR has witnessed an increased demand for computer-based training services, noted Martin Goetz, an ADR founder and senior vice-president who heads the Adroit division. "As computer automation filters down through the organization, there is a continuous need for training," Goetz said. "Large companies just don't have time for continuous one-on-ones."

Revenue boost saved Adroit

Goetz also noted that since ADR's business has improved — first-half revenue this year was up 30% — the company reexamined Adroit and believed it could afford to make an additional investment in it. "We're a big user of Adroit, and we expect [parent company] Ameritech will also be, so we had a vested interest in it," Goetz added.

ADR considered two serious offers for the product but deemed both unacceptable, Goetz noted. "If another company thought it could make [Adroit] successful, we figured, 'Why couldn't ADR?' " he explained.

A dedicated sales force will enable ADR to better focus its sales efforts on the marketplace, he said. A separate sales force is also needed because ADR's primary products are sold directly to MIS management, while education products at many large corporations are sold to training departments, Goetz said.

The company has hired James Giller, a former Mathematica Products Group and BIS Banking Systems, Inc. senior sales manager, to head Adroit's initial three-member sales force. The firm's 100-plus sales force is being asked to help generate leads, Goetz noted.

New release in beta testing

ADR said it has invested $2 million in research and development on Adroit during the last few years, some of which has gone toward developing a new release that it said will be available later in the quarter.

Currently in beta testing, the new release extends Adroit's stand-alone capabilities into what the firm calls mainframe concurrency training, Goetz said. With the new release, developers can use Adroit to create PC-help and tutorial systems around live mainframe applications that can run without further modification.

"A user can go into an application as if he's on an [IBM] 3270 terminal, and if there is a problem jump into an on-line interactive help facility," Goetz said.

Under the new release, Adroit's videodisk, touch-sensitive screen, synthetic speech and graphics/video overlay capabilities will support IBM's Infowindow environment, Goetz added.

Harris broadens Unix lineup with office-bound supermini

BY JAMES CONNOLLY
CW STAFF

FORT LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division filled out the middle of its Unix-based general-purpose processor line last week with the introduction of an office-environment superminicomputer.

The HCX-5 is part of Harris's 3-year-old CX line of systems, which are intended to expand Harris's market from the real-time, technical computing field into areas such as office automation and data base management.

Harris director of product marketing Rick Maule, compared the HCX-5 with the middle of Digital Equipment Corp.'s VAX 8000 family, noting that Harris's financial stability and experience in computer systems make it competitive with DEC. At the same time, he pitted the HCX-5 against superminicomputers made by younger price/performance leaders such as Pyramid Technology Corp.

Maule said the HCX-5, which uses proprietary 32-bit microprocessors, is a scaled-down version of Harris's high-end HCX-9. The HCX-9 requires industrial-type power supplies rather than the standard office power and air-conditioning used by the HCX-5.

Maule differentiated the HCX-5 from the next lower CX model, the MCX-5 supermicrocomputer, in terms of CPU power and I/O capabilities. He said the MCX-5 was designed to support fewer than 32 interactive users working on a casual basis. In a similar environment, the HCX-5 superminicomputer supports 64 to 128 users, he said. According to Harris, the HCX-5 is likely to be used as a departmental system or server while the HCX-9 is used as a host.

The company rated the HCX-5 at 5 million instructions per second (MIPS). The HCX-9 is rated at 8 MIPS, and the MCX-5 performs at 3.6 MIPS.

The HCX-5 is built around Harris's enhanced version of the VMEbus with a burst rate of 40M byte/sec. and a continuous throughput of more than 23M byte/sec., according to Maule. The system features a cycle time of 100 nsec, a virtual address space of 4G bytes and a physical memory of up to 32M bytes. It runs the Harris HCX/UX dual-universe operating system supporting AT&T's Unix System V, Release 2 and the University of California at Berkeley Unix 4.2.

A basic system costs $124,500 and includes an eight-slot VMEbus, 4M bytes of memory and a console processor with CRT.

Convex halves cost of memory, cuts system prices more than 20%

BY STANLEY GIBSON
CW STAFF

RICHARDSON, Texas — Convex Computer Corp. is slated to announce today price cuts on systems and memory for its 64-bit minisupercomputers.

Base system prices will be reduced by more than 20%, and memory prices will be slashed by more than 50%, the company said.

A base C1 XP1 system, which formerly sold for $475,000, will be priced at $320,000. The C1 XL system, which had sold for $375,000, will be reduced to $240,000, Convex said. The base configuration includes the CPU, 16M bytes of memory and an I/O processor.

Convex said memory prices will be reduced from $4,000 to $1,750 per megabyte. The new prices take effect immediately, the vendor said.

Cuts foreshadow future plans?

"It's not a surprise," said Jeff Canin, an industry analyst with Hambrecht & Quist, Inc. in San Francisco. Canin speculated that Convex is paving the way for a new generation of machines to be announced later this year.

The processors, which Canin said may be called the C2 line, could offer twice the processing power and a tightly coupled architecture. He added that the processors' clock speed could be 40 to 50 nsec and said the processors' could offer multitasking.

Canin suggested that Convex's goal is to keep its prices below $1 million on the new machines. To do so, he said, the company will have to reduce prices on its current products.

'Good marketing'

"It's good marketing, with Digital Equipment Corp., Hewlett-Packard Co. and others increasing their price-performance in minicomputers and looking at parallel processing," said Julian Menear, an analyst with the Pershing Division of Donaldson, Lufkin & Jenrette, Inc. in New York.

Menear said it is likely that Alliant Computer Systems Corp., which makes a parallel processing system, will also cut prices.

He speculated that that would not happen until up to six months from now.

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EDITORIAL

After the fall

In *Julius Caesar,* Shakespeare noted that the good that people do in their lives is often interred with the body.

With the sudden death of Commerce Secretary Malcolm Baldrige, let us hope the bard's vision does not materialize.

In his 6½ years of steering the Department of Commerce, Baldrige set a course governed largely by reason, pragmaticism and justice. The persuasiveness of his doctrines even moved a philosophically entrenched president — his boss — to a more moderate view on international trade, even as the hawks in the Department of Defense tried to peck holes in his policies.

Through all this, the computer industry has benefited greatly. As the Computer and Business Equipment Manufacturers Association noted in a public statement, Baldrige was a vital figure for the information technology industry, justly seen as one of the most effective secretaries of commerce in recent decades.

Among his more notable achievements, Baldrige bucked the fervent antiprotectionist policy of the Reagan administration in coming to the aid of the crippled semiconductor industry. He successfully argued for stiff enforcement of trade accords that would punish the Japanese for dumping chips in the U.S. market. He ardently opposed the acquisition of Fairchild Semiconductor Corp.'s chip business by Fujitsu Ltd.

Today, the semiconductor firms are nursing themselves back to health, but not by hiding behind unreasonable protectionist measures.

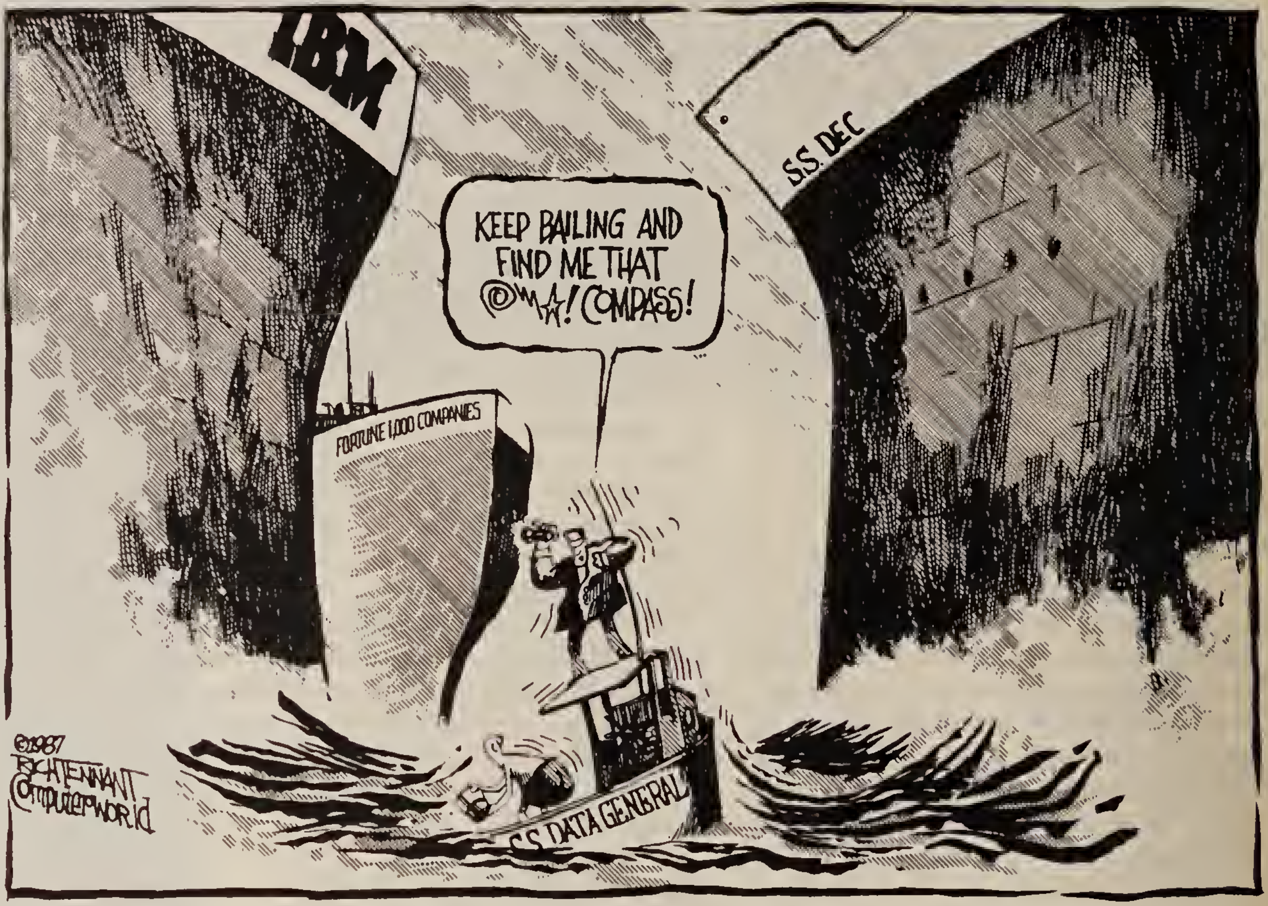
Baldrige was no less controversial in his fight with the Defense Department to liberalize technology export policies. Let us hope his passing does not revitalize the efforts of myopic generals whose desired trade sanctions serve only to strengthen foreign competitors at the expense of U.S. vendors, while doing nothing to improve our national defense.

Let us hope instead that, in the waning months of the Reagan administration, the president will honor the good that Baldrige brought to the trade scene. His successor must think globally in terms of the high-tech business, realizing that the final product likely includes components from several different producers in several different countries on different continents. Thus, tariff sanctions should be a last resort only.

Invest in human resources. If the government continues to shun support for public education, our information age society will suffer irrepairable damage as we move toward the 21st century.

Demilitarize scientific research and stop concentrating so much government-funded research and development on military applications. A nation's security is based on military power and a strong economy.

Reject the myth that services will be an adequate replacement for a manufacturing-based economy. On the contrary, these two segments are finely interwoven and depend on one another. If computer-aided manufacturing is a possible panacea for our manufacturing ills, then let's support its proliferation.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LETTERS TO THE EDITOR

Only just begun

Because the two articles on MIS education [CW, June 15 and June 22] portrayed the field as being in decline, I would like to point out that it is, in fact, in such an early developmental stage that current educational programs have primarily been patched together from already existing ones. Rather than being in decline, MIS education has not yet reached the point at which it has many programs that are specifically designed to meet the needs of the field.

For the last 25 years that I have been in the information systems business, we have realized that the best preparation for people who are going to have an impact is a balanced combination of business and technical education. However, most educational programs are either primarily business-related with a modest information systems major or primarily information systems with a little bit of business.

At the University of Pittsburgh, we have a new MBA-MS "double-degree" program that emanated from an IBM grant and provides balance between business and information systems material *and* significant quantities of both so that a double-degree graduate is a full-fledged MBA and a trained information systems practitioner.

We have finally "bitten the bullet" on the required dual education, rather than trying to cram both types of material into a single, already-overcrowded degree program. We have done this with a lot of input from business people and on the basis that they find these students attractive and will hire them.

Now that firms are beginning to realize they can manage information resources only by having a chief information officer who has a balanced business-information systems education, the time has come for us to do what we have known is needed all along. We are doing this with the help of the IBM grant, with funds and technology from other sources and with help from forward-looking Pittsburgh-based corporations. We believe other schools that can pull together the required support are, and will be, providing this too.

William R. King
Professor of
Business Administration
University of Pittsburgh
Pittsburgh

This week in history

Aug. 1, 1977
Mountains of sludge, up to eight feet of water and virtually nonexistent communications hamper rescue workers in Johnstown, Pa., who struggle to save computer equipment and installations recently damaged by a flood. "Some of the installations don't even exist anymore," says a distressed IBM spokeswoman.

Aug. 2, 1982
Fifteen percent of current American manufacturing workers could lose their jobs by the end of the decade because of electronics technology, a congressional study reports. The study says that industrial robots could eliminate three million jobs in the near future and seven million by 2000.

Misses the mark

I question the emphasis placed on developing personal computer security policies in your "Microcomputer security" Spotlight [CW, July 13].

While it is a good sign that organizations are becoming aware of the need to protect information stored in PCs, a special PC security policy tacked on to a mainframe security policy probably misses the mark.

As a consultant and former director of information security for a large multinational corporation, I cast my vote for organizational policies that establish control requirements for information assets, no matter where they are stored or processed.

An effective organizational information security policy spells out protection requirements based on the value and/or sensitivity of data.

Protection techniques will vary as information moves from file cabinet to PC to mainframe but must satisfy control requirements approved by corporate management.

Personal computer security policies, in contrast, are generally developed and promulgated by the information systems department and spell out specific procedures or security products to be utilized.

While corporate information security policies require a higher level development and approval process, the end result is continuity of protection throughout the life cycle of information and elimination of the need to develop new policies as technology evolves.

Cheryl W. Helsing
President
Cheryl W. Helsing, Inc.
San Francisco

The contra dance of moral behavior

JOHN KIRKLEY

We haven't had such good daytime television since the Joseph McCarthy hearings. Any program that can outdraw America's favorite soaps must have a lot going for it — pathos, drama, conflict, suspense, glamour, greed, patriotism and glimpses into the inner workings of the mysterious world of covert operations. Added to this steamy brew are generous dashes of that heady seasoning, LCS (lying, cheating and stealing).

Even more, the Iran-Contra hearings have sharpened our awareness of the semantic gymnastics that highly placed officials will perform to justify actions that appear to violate the most fundamental legal and ethical standards of this country.

One of the concepts that has surfaced at the hearings, articulated most ably by Rear Adm. John Poindexter, is that of "deniability." Put rather crassly, the concept goes something like this: If, in your professional capacity, you do something that may be unethical, immoral, illegal or perhaps just in bad taste, you don't let your supervisor know it. Then if you screw up, you have given your supervisor the gift of deniability.

Lie, cheat and steal

If you add the concept of deniability to the other major message emanating from the hearings — that it is all right to lie, cheat and steal in the name of freedom and righteousness — you have powerful behavioral guidelines that reverse what most of us have been brought up to regard as moral and ethical. Hearty doses of Orwellian doublespeak have been beamed live to an enthralled audience.

All in all, these are illuminating times, particularly if you apply lessons learned in one arena, such as the Iran-Contra hearings, to events in other areas. For example, right in the middle of the Contragate hearings, there are reports that the Federal Bureau of Investigation is considering a controversial proposal. The advisory board to the FBI's National Crime Information Center (NCIC) has recommended a major expansion of the NCIC's capabilities.

The NCIC 2000 plan calls for the creation of new data bases to help nab criminals, which advances in connectivity and networking are making feasible. Among the recommendations is the use of the NCIC to track the movements of foreign spies, terrorists or the subjects of criminal investigations. The board also wants to add misdemeanors and juvenile crimes to the files. The board did reject the idea of putting the NCIC on-line to private data bases such as telephone records, credit bureaus and airline passenger lists.

Naturally, these recommendations generated considerable flack. The American Civil Liberties Union pointed out the abuses such an enhanced NCIC could engender. The FBI retorted that the board recommendations would be reviewed by the top levels of the FBI, including the acting director, before any decision is made.

But what happens if the individuals using this tool adopt the same set of ethical and moral guidelines articulated by Poindexter and Lt. Col. Oliver North? North's willingness to mislead Congress and destroy critical documents — in other words, to lie, cheat and steal in the name of patriotism — accorded him the status of hero with much of the American public. Giant stacks of yellow telegrams, carried daily into court by his wife Betsy, intimidated the committee and attested to wide public acceptance of his behavior.

As high-level FBI officers continue their war on crime, should they be denied the same flexibility of action that North, Poindexter, former National Security Adviser Robert McFarlane and all the rest were accorded?

And what about the concept of deniability? Isn't it all right for well-intentioned members of the FBI to keep operations involving gross violations of civil liberties and personal freedom from their superiors, members of Congress, other overseeing bodies and even the president? We also have to ask: Have we forgotten what J. Edgar Hoover became in the last decades of his tenure?

We cannot succumb to the topsy-turvy moral and ethical standards being voiced by those government officials we watched day after day. If we do, the NCIC and the other systems of surveillance we are developing with the help of computer and communications technologies could lead us into a totalitarianism far worse than we could imagine. Our misguided attempts to defend our freedoms may lead to our own imprisonment.

Kirkley, a former editor of *Datamation* magazine, is an industry consultant currently acting as editorial adviser to Patricia Seybold's Office Systems Group. He is based in South Nyack, N.Y.

Victim of a nonevent (again)

Numbers, names and nice invitations do not an announcement make

AMY WOHL

Have you been to any good nonevents lately?

A nonevent often masquerades as a press announcement or a consultant's briefing. All the requirements seem to be in place: a major vendor's name, nice invitations, promised senior executives and a spiffy location in New York, Boston or "somewhere in the Silicon Valley."

You decide to attend. You go. All your friends and colleagues are there. The senior executives get up and speak. They even answer questions.

However, nothing seems to have been announced — no new products or corporate strategies, no significant pricing or distribution changes, no delays or speedups in product deliveries.

PETER KUPER

What is happening here? You have just been the targeted victim of a nonevent.

Nonevents occur because a vendor is unhappy with the volume or direction of comment the company, its strategies or products are getting. Usually, this dissatisfaction is with the press, but sometimes it is with the analyst and consultant community.

Nonevents are particularly annoying when the targeted press/analyst/consultant attendee feels he has been doing a good, hardworking job of explaining something complicated to the market, and the vendor believes it is a terrible job — largely because the company doesn't like the way its product or strategy is being perceived or interpreted.

I call this the luck of the draw. Sometimes, we all agree on what is happening, and all we have to do is accurately report it. Other times, we don't agree. In that case, there are the following ways to proceed:

- We can agree to disagree. The vendor gets the short end of this stick and knows it. We get to write and tell our version (with full access to our publications and our speaking platforms, to say nothing of our consulting recommendations). The vendor gets to complain about it from whatever forum the company chooses.
- The company tells us where it thinks we're wrong and asks for correct coverage. This approach works fine if we're convinced, but often we're not and with good reason. Just because a vendor thinks its unnecessary new widget is a real barn-burner doesn't make it one.
- The vendor tries to fake the press/analyst/consultant community into thinking it has something new to say (what the company has already said, suitably repackaged), hoping for fresh, new coverage with more attention paid to what the vendor thinks is the "right" point of view. Enter the nonevent.

Nonevents of note

Recent nonevents of note include IBM's briefing of the press/analyst/consultant community on the success of the Personal System/2 product deliveries. I doubt there was any member of the community who failed to note the numbers presented, of which there were plenty. But analysts tend to place their own interpretation on numbers.

For instance, big backlogs are significant in the short run if they include lots of orders from many different companies and less significant if they include lots of long-term business, a good amount of inventory or a few very large orders that tend to distort everything.

Several large computer retailers have noted that one reason for the big PS/2 backlog is the need for IBM Personal Computer retailers who have not been classified as "advanced" to order great numbers of PS/2 Model 30s in order to qualify. This situation has not only enlarged the backlog (IBM is clearly faced with more orders than product right now), it has also created an immediate discounting of this product because dealers are ordering more Model 30s than can be supported by their customer demand.

In this case, IBM achieved the desired result: lots of front-page news on how well the PS/2 is doing, lots of attention on the size of the backlog and not much attention to a thoughtful analysis of what exactly is going on.

Another good example of a nonevent is the recent Compaq/Microsoft/Ashton-Tate/Lotus et. al. briefing in New York. The ostensible reason for this nonevent was the press and customer confusion between PS/2 and OS/2.

I wasn't confused before the meeting, and I don't think most of the other attendees were either, but none of us could afford to miss a meeting that had so many chief executive officers at the front of the room.

The real reason for this event, I suppose, was an opportunity for Compaq Computer Corp. to tell us how well it was doing (we knew already), plus a little advance solidarity on the part of major personal computer software developers in case it turns out that the OS/2 Extended Edition is more threatening to third-party software developers than some of us think it will be.

The interesting issue at this and other nonevents is that many of us may be entirely, or nearly entirely, in agreement with what has been said — we just don't think it deserves major additional coverage.

Press coverage is not infinite. If we write, comment, analyze or speak one more time about something we all know, we aren't writing, commenting and so on about something else, possibly something that is more important.

Perhaps vendors need to remember the story about the boy who cried wolf. If companies keep asking for coverage for nonevents, we may not hear the need for coverage for their real events above the din.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

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SOFTWARE & SERVICES

SOFT TALK

Daniel R. O'Connell

Look beyond transparency

As a consultant in the area of data base management systems, I have become increasingly concerned with the performance and quality of the data base transparency software offered by many vendors.

It is unfortunate that many corporations are basing their decisions to replace existing data base systems on the belief that this software will allow a quick and easy migration.

After studying various types of transparency software offered by several vendors, it is clear that many of these products work poorly at best and, at worst, can cause severe disruption to an organization.

The purpose of this software is to allow an organization to implement a new data base system while allowing the existing data base programs to run in an emulation mode.

Many vendors are now offering software to allow for the emulation of IBM's DL/1, VSAM, Cincom Systems, Inc.'s Total and Cullinet Software, Inc.'s IDMS. I feel the problems involved with this software are twofold.

First, in order to emulate another software product, the emulation software must be many times more complex than the original product.

Continued on page 22

TRW wards off data intruders

Proprietary expert system protects 133 million consumer credit records

BY ALAN J. RYAN
CW STAFF

ORANGE, Calif. — Protecting a data base that encompasses the detailed credit history of 133 million consumers is not a task every computer security officer longs to do.

TRW, Inc.'s Information Services Division operates and markets a mammoth computerized consumer credit reporting service, called Credit Data, which receives between 400,000 and 450,000 calls daily from subscribing banks, retailers, credit card companies, finance companies, savings and loan institutions and travel and entertainment card granters.

To combat any possible unauthorized access attempts to the more than 100G-byte data base, TRW recently developed an expert system it calls Discovery.

The Discovery system reportedly recognizes unauthorized access attempts to the data base before traditional security methods can. "The primary need for the Discovery system was to find out if anybody was [gaining unauthorized] access to the system and in what volume," explained Bill Tener, director of operational and regulatory compliance at TRW.

Tener said that without a monitoring system in place, the chances of discovering unauthorized access were slim.

'Expect to catch' abusers

TRW knows there are potential abusers of its system, said B. K. Richard, project director for Discovery and director of advanced technology for the Information Systems Group, "and we expect to catch them with Discovery."

To date, no illicit activities have been detected by Discovery, which has been up since mid-March.

But Tener and Richard said those findings are not a good indicator of what they expect to see. Tener said that during the six-month testing of the system's prototype, in which Discovery was tested in parallel with actual cases being pursued by TRW investigators, "Discovery actually gave us more data than my investigators had initiated."

Discovery found that a hacker and a private investigator were invading the credit file without authorization.

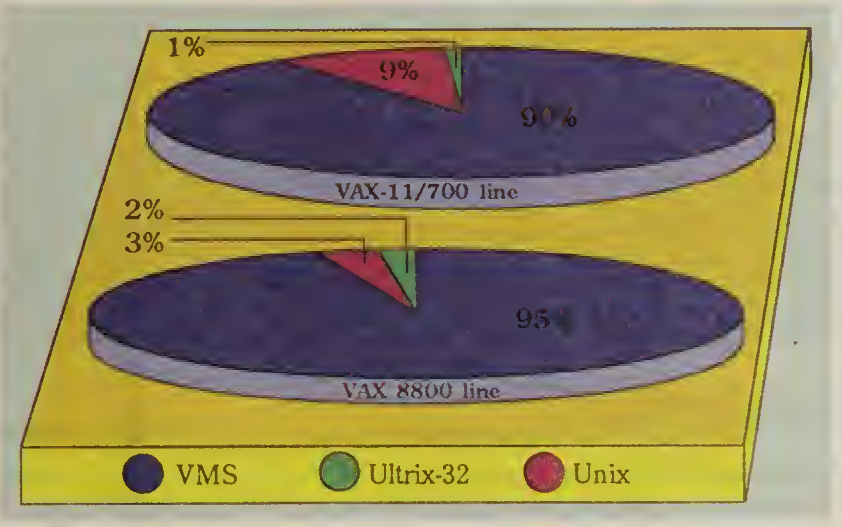
The developers of Discovery leveraged the artificial intelligence technology developed by parent company TRW's electronics and defense sector for the defense industry and applied

Continued on page 25

Data View

Primary operating systems on the VAX-11/700s and 8800s

VMS dominates on both machines, but Unix outstrips Digital Equipment Corp.'s Ultrix on the 11/700s



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Ideal steps back to Cobol

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. recently unveiled a cross compiler to translate commercial transaction-processing code written in Applied Data Research, Inc.'s (ADR) Ideal fourth-generation language into IBM-standard Cobol.

The compiler is the first in an expected series of products marketed under the name Crosscode, which will be targeted at recompiling fourth-generation language code into Cobol, the

Continued on page 25

Apollo eyes standard interface

CHELMSFORD, Mass. — Apollo Computer, Inc. plans to offer a tool kit this fall that will allow software developers to create user interfaces that will run on a variety of hardware platforms, company representatives said last week.

Open Dialogue is based on the windowing system from MIT known as X Windows. Earlier this year, a number of technical workstation vendors, including Apollo, announced their support of X Windows as an international windowing standard.

The tool kit was designed to run in a Unix environment, including the Unix versions offered by the major workstation vendors. By basing Open Dialogue on X Windows, it will be portable to these various environments, Apollo said.

Positioned to set standard

Apollo said it intends to license Open Dialogue source code to developers and other hardware vendors in an effort to make the tool kit an industry-standard user interface environment. It will sell for $2,000 for a single license, the vendor said.

Apollo is expected to offer two versions of Open Dialogue

Continued on page 22

Inside

- Tandem to offer Ada on its Nonstop line. Page 25.
- Computer Associates interface ties Supercalc/MF to DB2. Page 25.
- Blueline Software enables VM session management on single terminal. Page 27.

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Transparency

CONTINUED FROM PAGE 21

REMEMBER that even if the transparency software performs at a satisfactory level, the organization must now maintain expertise in both the old data base software and the new data base software.

In the past, emulation was successful for small software applications in which the scope of a product was quite simple. However, in today's data base environment, the emulation of another's data base product requires complex layers of software to act as a bridge between the two products. It is the communication between the software layers that results in high overhead and slow response time.

Second, emulation requires an intimate technical knowledge of another vendor's software product. It is my opinion that most vendors do not possess this knowledge. Therefore, the emulation software does not provide full compatibility with the existing programs.

In testing such software, several users report that problems encountered within programs running under emulation occur at some of the most basic levels. One user tells of her frustration about how she argued with a technical representative about what a "Path Call" was in DL/1.

Converting a data base system is a major effort that must be thoroughly planned and researched. Many major systems will need to be redesigned, and numerous modifications to programs and data structures will be required.

Before an organization considers such software, it should investigate the following aspects:

- Ask for references. Find out who is using this software and call or visit them.
- Discuss and clarify the scope of the transparency software with the technical representatives of the vendor and with known users of the software.

If the transparency is for DL/1, for example, determine how the software performs with logical relationships, secondary indexes, hierarchical direct-access method (HDAM) organizations with user-supplied randomizing routines, hierarchical indexed direct-access method-to-HDAM relationships, Path Calls and the like. Many of these software products will function only in the most trivial cases.

- Ask for the software on a trial basis, install it and perform a complete and thorough test. Include in the test the handling of abnormal ending conditions. Stress-test the software in an on-line environment. Many of these products have terrible response times on account of the layers of software involved.
- Have a clear understanding of the vendor's support for the transparency software. Many vendors provide excellent support for their DBMSs. However, it is sometimes difficult to locate anyone at a vendor's support center with knowledge of the transparency software. Support may sometimes take days or weeks.
- Remember that even if the transparency software performs at a satisfactory level, the organization must now maintain expertise in both the old data base software and the new data base software.

For example, if DL/1 is replaced by the transparency software, an organization must still maintain the programs running under the DL/1 emulation as though DL/1 still existed in the user environment.

Another consideration is the difficulty in finding experienced and knowledgeable people. It is a difficult task finding people with experience in even one data base system, let alone two.

The need for many organizations to migrate their old DBMSs to new, more powerful systems cannot be denied. It is unfortunate, however, that in their attempt to sell products, many vendors mislead organizations as to the scope and capabilities of the transparency software they offer.

O'Connell is an assistant professor of computer science at the State University of New York at Fredonia and a consultant on data base software.

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Apollo

CONTINUED FROM PAGE 21

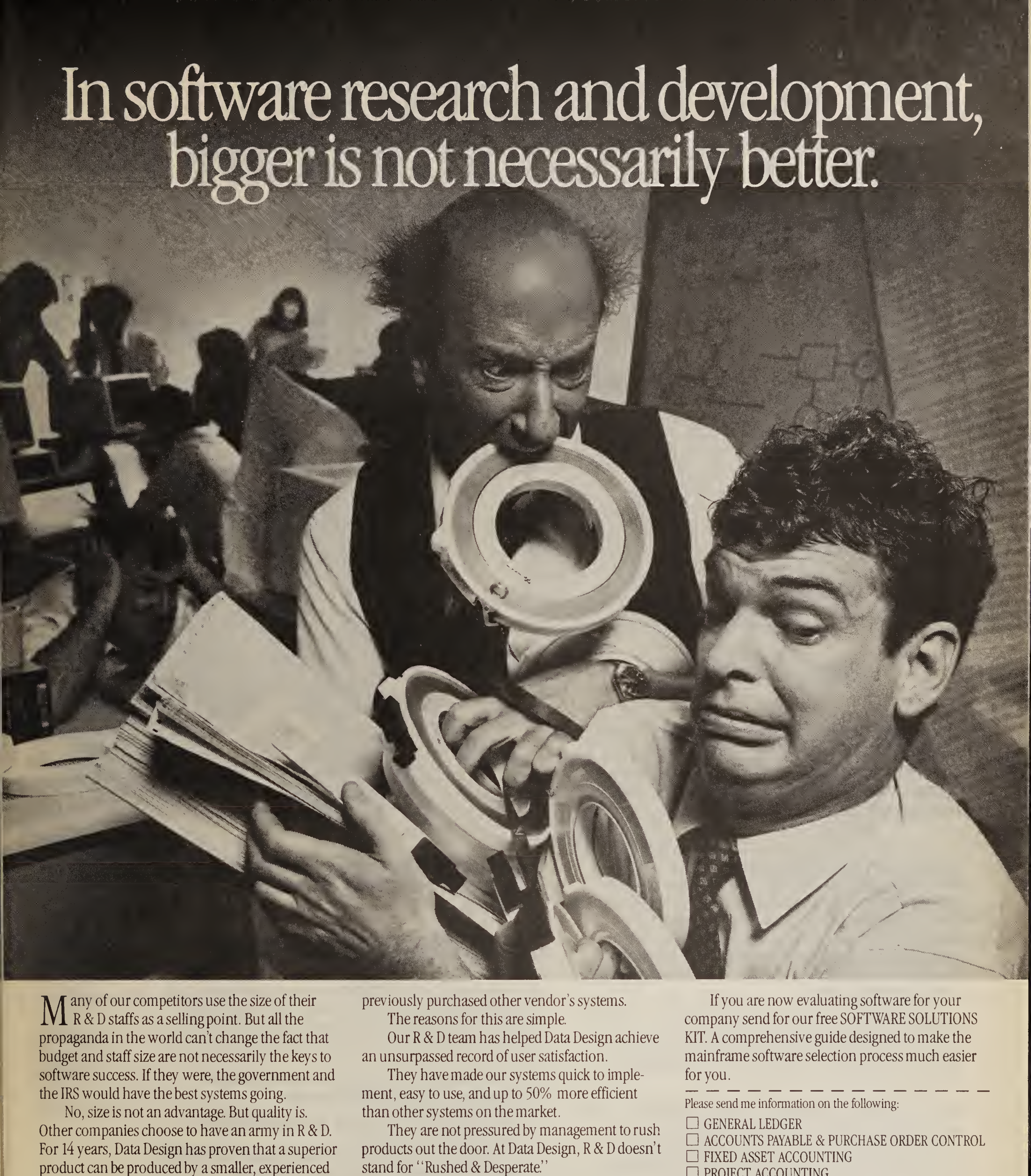
— one for its own hardware and one for the Digital Equipment Corp. Vaxstation/GPX series — when it initially releases the product.

In early 1988, Apollo will offer the product for Sun Microsystems, Inc. hardware and the IBM RT Personal Computer, a company spokesman said.

With Open Dialogue, developers can design user interfaces that are separate from the actual applications. As a result, the interfaces can be customized to a particular user's needs with a minimum amount of code rewriting, Apollo said.

A company spokesman said the product is also aimed at large user sites that typically write their own application software in addition to using off-the-shelf packages.

In software research and development, bigger is not necessarily better.



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Ada OK'd for Tandem line

Firm to offer language, compiler for Nonstop series

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. recently announced that it plans to offer the Ada programming language and associated programming tools for its Nonstop series of computers late this year.

Tandem said it has successfully tested an Ada compiler for compliance to federal standards.

The tests performed by the U.S. Department of Defense's Ada Joint Program Office have validated the Tandem compiler as conforming to both the ANSI/MIL-STD-1815A and ISO/8652-1987 standards, according to Richard Vnuk, Tandem's manager of languages and tools.

Language requirement

The Defense Department mandates the structured development language for mission-critical systems projects. Ada is also widely used in government agencies such as the National Aeronautics and Space Administration, where "many contracts specify the language as a requirement," Vnuk said.

In addition to the Ada language and a compiler, Tandem said it will provide an Ada library manager, a binder and a symbolic debugger.

The Tandem Ada language, which the vendor said runs on all the Nonstop systems, supports programs that have up to 4M bytes of instruction code. It can also manipulate up to 128M bytes of data per single process within a Nonstop system, Tandem said.

Available by year's end

The Tandem Ada language is scheduled to become available for shipment during the fourth quarter.

Tandem Ada for the Nonstop VLX, TXP and Nonstop II systems is priced at $20,900 with a monthly license fee of $800.

A license for the Tandem Nonstop EXT and CLX systems is $10,475 per system, and the monthly license fee is $400.

TRW

CONTINUED FROM PAGE 21

that technology to its commercial business at the Information Services Division. Because of the enormity of the credit data base, the development of the system was a top priority, Tener and Richard said.

System educates itself

Discovery is a self-educating system that continually updates and refines itself. Housed on an IBM 3090 Model 400 mainframe, it examines subscriber inquiry patterns and determines irregularities through pattern recognition.

For example, one TRW subscriber may call TRW's consumer credit data base to access information on a potential customer. The subscriber always uses the initial of the customer's spouse when he calls. Discovery knows this, so when a call comes in using the subscriber's entry code but omits the spouse's initial, Discovery will note that this inquiry should be investigated.

If the system detects any questionable activity, it alerts the division's security investigators. Since Discovery is a batch process, the alert would not come until the end of the workday. "In theory, it could be hooked up to be an operational, real-time kind of auditing tool," Richard said, "but current implementation at this point is strictly batch."

Investigators continue probe

To pursue an intruder, TRW investigators would be called in. "They would have a few better leads [than they would conducting the investigation manually] because of the amount of data the program can sift through," Tener said.

Investigators would then contact the subscriber to determine if improper access had been used. "At that point, the investigators can either put traps or traces on our phone line to determine the number coming in, or get a court order to put one on the phone line being investigated," Tener added.

To protect a file that had been accessed illegitimately, Tener said TRW would change the file's password, "unless law enforcement would want us to keep that code on" to help detect the perpetrator.

The TRW officials said that this type of protection system gives them an edge in the credit information industry by enhancing the company's ability to protect private information and discourage people from abusing the system.

Host Supercalc linked to DB2

ANDOVER, Mass. — Computer Associates International, Inc. recently produced an interface to link its mainframe spreadsheet, Supercalc/MF, to IBM's DB2 data base.

Computer Associates said Supercalc/MF-DB2 should provide access to data in IBM mainframe DB2 files from within Supercalc/MF and was designed to function in the IBM MVS operating environment.

The Supercalc/MF-DB2 interface is scheduled to be available this month.

The format of the DB2 interface is a fill-in-the-blank full screen by which users may designate the fields to be loaded, the vendor said.

The interface is said to support password security for the protection of sensitive DB2 data. Supercalc/MF-DB2 security features include user-defined protection at the record, field and value-within-field levels.

Supercalc/MF was formerly called CA-Megacalc. According to the vendor, the name change reflects the success of Supercalc4, Computer Associates' microcomputer spreadsheet.

Supercalc/MF prices range from $9,600 to $44,000.

Ideal

CONTINUED FROM PAGE 21

firm said.

While recompiling from fourth-generation language to third-generation language code may seem like a step backward, there are many good reasons to do so, noted Irwin Konopolsky, assistant vice-president at On-Line. Using Cobol to run applications developed with a fourth-generation language like Ideal will speed runtimes by up to 10 times and make more efficient use of computer resources, he noted.

"Using a fourth-generation language may increase programmer productivity — which is fine for developers — but the problem arises when you try to run the application," he said. "Most fourth-generation languages are not as efficient when running applications; response time is slow, and sometimes they use too many computer resources."

Crosscode also allows programmers to use familiar Cobol techniques to maintain code, he said. This speeds maintenance, particularly of large applications.

Portability is another issue, Konopolsky said. Using Crosscode, a company may only need to have a copy of a fourth-generation language in its development shop and recompile applications so they can run on machines at other locations.

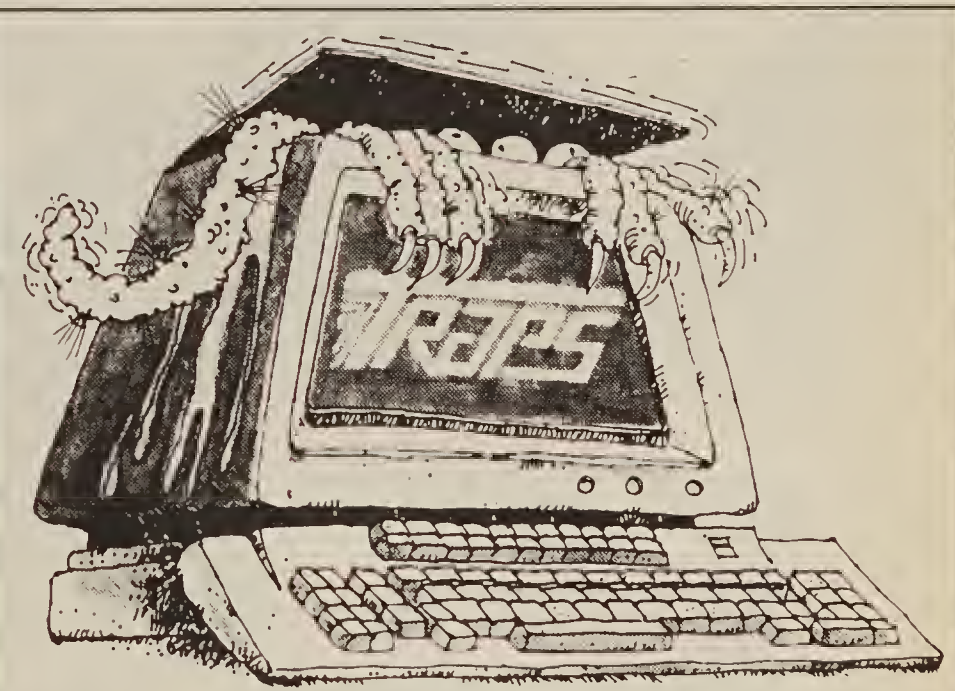
'That cozy feeling'

"Some companies also like that cozy feeling of staying with something that is a strategic IBM product," he added. "Ideal is not a strategic IBM product, while Cobol and CICS are."

Crosscode was developed by Fourcross, Inc., a San Francisco software developer that On-Line purchased last year. It carries a license fee of $60,000, but the vendor is offering it for $40,000 until Aug. 31.

Konopolsky said On-Line has not yet signed any customers for the product, although a half-dozen companies have asked On-Line to convert applications submitted on tape to demonstrate the product's performance.

An ADR spokesman said the firm is not worried about the impact of Crosscode on Ideal. "We've been aware of the product for a year," he said. "No one is clamoring for it." ADR's approach to application development is to continue to enhance Ideal and provide additional productivity tools. "We think that's the right way to go, rather than keep customers in Cobol," he concluded.



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NEW PRODUCTS

Systems software

A software package introduced by **California Software Products, Inc.** is said to provide transport of IBM System/36 RPG-II applications to personal computers.

The software, called the **Automated Conversion System**, was designed for use with the vendor's Baby/36 software, which emulates the operating environment of System/36 computers on PCs. It operates in conjunction with IBM 5250 terminal-emulation packages or 8- to 5¼-in. diskette conversion products.

One program system runs on the System/36 and prepares source and procedure members of transport. The other system runs on the PC and converts the characters from EBCDIC to ASCII and compiles all source code.

The Automated Conversion System costs $750.

California Software Products, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701.

Multiterm Version 4, a VM terminal session manager, has been announced by **Blueline Software, Inc.**

Multiterm is said to allow a user to log on and run many VM sessions simultaneously from a single physical terminal. Version 4 offers an automatic feature that gives users access to all sessions with a single logon.

Multiterm interfaces with security products that require user IDs and passwords. It also reserves one or more predefined dial-up addresses.

Multiterm Version 4 provides direct access to CICS applications running in VM guest machines. It also permits users to send and receive communications between sessions, terminals and guest machines.

A Multiterm Version 4 site license costs $9,775.

Blueline Software, Suite 340, 1500 S. Lilac Drive, Minneapolis, Minn. 55416.

Software said to provide mainframe distribution and backup of personal computer software and data in IBM MVS and VM/CMS installations has been announced by **Applied Software, Inc.**

Designed to distribute site-licensed software, **Host Storage & Retrieval** (HSR) provides an electronic warehouse and distribution center. PC users can display available software and select packages for downloading.

In addition to mainframe backup of PC data, features include import and export mainframe utilities for file transfer to and from the personal computers and data security features.

HSR may be installed with IBM's MVS/TSO, VTAM or VM/CMS. Asynchronous communications are supported. It costs from $8,000.

Applied Software, Suite 250, 840 U.S. Highway #1, N. Palm Beach, Fla. 33408.

Applications packages

Computervision Corp. has introduced **Tech Pubs II**, software packages designed to help users of its Caddstation family of 32-bit engineering workstations document their work.

Tech Pubs II applications currently available include a package for engineering notebook and a package for technical documentation. Engineering notebook documentation allows an engineer to document calculations, analysis, research and other activities. The technical documentor software features integrated text and the vendor's Cadds 4X graphics in addition to multitasking windowing capabilities and custom design of layout and typography.

The engineering notebook module costs $2,500. The technical documentor module costs $7,000.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

A new release of the **Autograph** multiuser business presentation graphics application designed for Unix systems has been announced by **Fischer Information Corp.**

Autograph Version 2.69 runs on either character-mode or bit-mapped terminals. It features a direct interface to Quadratron Systems, Inc.'s Q-Office and R Systems, Inc.'s R Office word processing programs, allowing users to merge charts and graphs into the body of their documents. The Autograph release also supports merging with Unix test editors.

Version 2.69 includes support for floating decimal points.

Version 2.69 costs between $495 and $9,995, depending on machine classification.

Fischer Information, 10250 Chester Road, Cincinnati, Ohio 45215.

Utilities

Evans Griffiths & Hart, Inc. has enhanced its **Vselect** machine-language record extractor for Digital Equipment Corp. VAX/VMS environments.

Vselect Version V4.0 is said to handle record management system (RMS) fixed-record-length sequential, relative and indexed files.

Vselect employs user-specified selection criteria to extract records from input files into an output file, optionally modifying the output record by deleting, inserting, rearranging or conditionally copying

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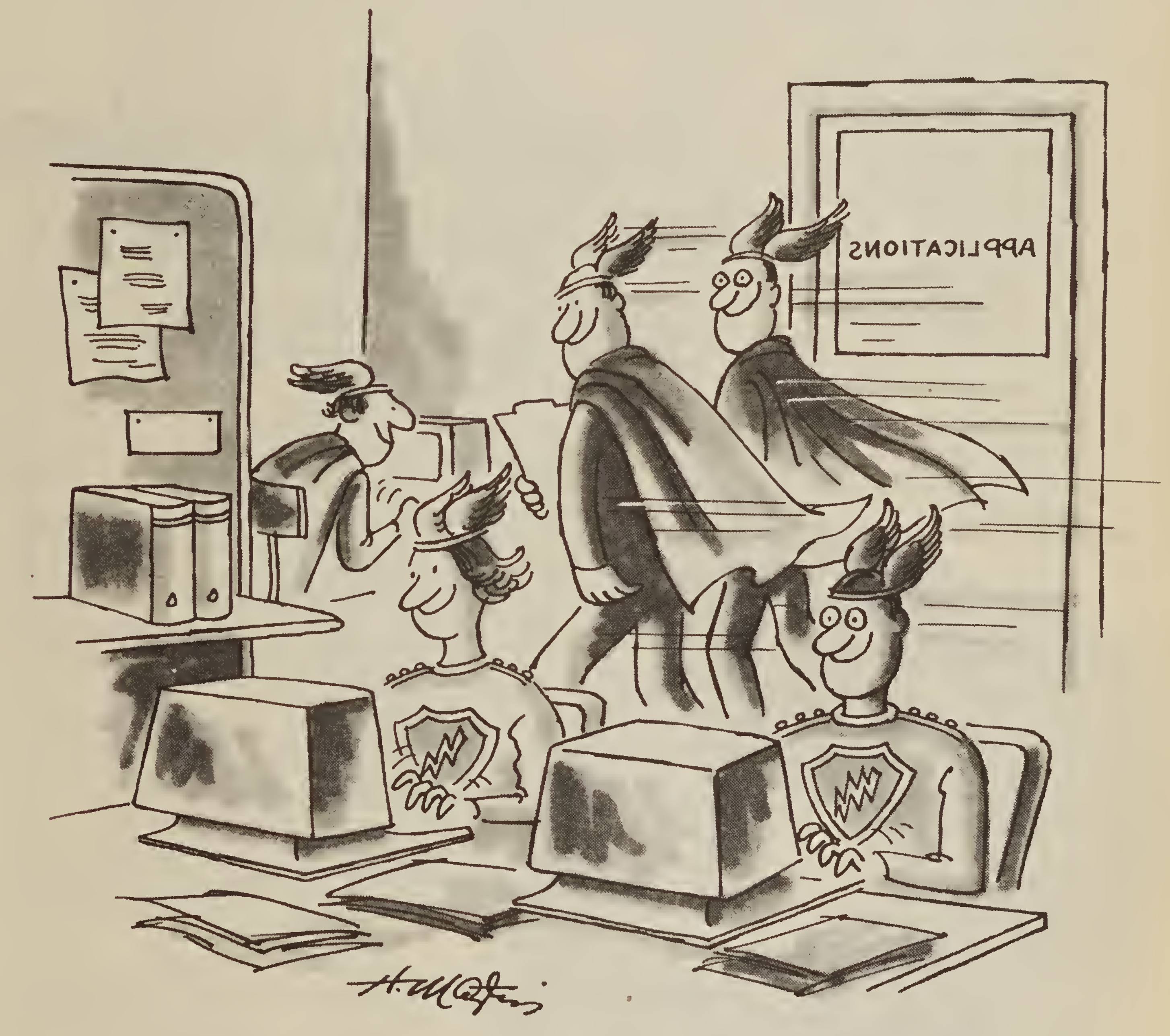

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Continued from page 27

input files.

Features of Version V4.0 include input file support for RMS Prologue-3 indexed files, pointer files and variable-length RMS relative files. Signed and unsigned quad-word integers are also supported.

A single CPU license for Vselect costs $1,500.

Evans Griffiths & Hart, 55 Waltham St., Lexington, Mass. 02173

Hexpose II, an enhanced version of the Hexpose screen-oriented file editor that allows the user to view and modify files in both ASCII and hexidecimal, has been introduced by **Specialized Systems Consultants, Inc.**

Hexpose II can patch object modules, examine word processing files, repair damaged file systems and verify the results of I/O operations, the vendor said. Enhancements include the ability to send the current screen to the print spooler, the ability to spool entire files in ASCII and hexidecimal to the print spooler and the ability to specify two files to display simultaneously from the command line.

Hexpose II is available in binary form for Unix systems for $75. Source code costs $300.

Specialized Systems Consultants, P.O. Box 55549, Seattle, Wash. 98155.

Outlook Software, Inc. has introduced the **Outlook Menu Design System** for the IBM System/38, a utility said to allow users to customize all the menus within the Outlook Modeling System, the Outlook Report Writer and a user's own in-house applications.

According to the vendor, options from each of the other Outlook utilities, as well as a user's own programs, can be customized on separate menus or integrated together. The system allows end users to create their own menus in the format of their choice.

The product comes with complete Help text and a user manual. It contains security considerations, allowing the designer to secure both entire menus or specific options within a menu.

The Outlook Menu Design System is priced at $950.

Outlook Software, Suite 313, 825 N. Cass Ave., Westmont, Ill. 60195.

On-Line Software International, Inc. has ported its **Omnilink/36** file transfer link software package and its **Executrieve/36** information retrieval system to the IBM System/36 Personal Computer 5364.

Omnilink/36 allows bidirectional data transfer between the System/36 PC 5364 and an IBM Personal Computer or compatible. It features English commands, arithmetic processing and multiple-file access, which lets PC users download data from the host system.

Executrieve/36 is an ad hoc query, graphics and reporting tool that uses English statements to allow users to select and sort information and design reports.

Omnilink/36 costs $700. Executrieve costs $950.

On-Line Software, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Intel Scientific Computers, a division of Intel Corp., has introduced the **VAST-2** Fortran vectorizer for the IPSC-VX vector-concurrent computer system.

Developed by Pacific Sierra Research, VAST-2 is said to accept standard Fortran 77 applications and vectorize the code, including IF loops, to reveal low-level parallelism, which can then be exploited by each node.

The ISPC-VX system is a large-scale parallel computer containing up to 64 vector processing nodes.

The VAST-2 vectorizer is priced at $10,000.

Intel Scientific Computers, 15201 N.W. Greenbrier Pkwy., Beaverton, Ore. 97006.

Two software utility packages designed for use on the IBM System/38 minicomputer have been announced by **GT Software**.

The **Utility Trilogy Version 2.0** is said to produce file and program cross-reference listings, disk-utilization reports and network-configuration reports. New features include the ability to produce network-management reports by line number with all attached control units and devices as well as a workstation control-unit report with attached devices sorted by unit address.

The **Magnetic W2 Reporting** package is said to meet federal requirements for W2 reporting on tape or diskette.

Each of the packages costs $500.

GT Software, P.O. Box 10054, Atlanta, Ga. 30319.

Services

An **assembler language conversion system**, designed to convert assembler language source code to Cobol source code, has been announced by **Belcastro Computer Services**.

The converter is said to handle both batch and on-line source code and also convert ISAM files to VSAM files.

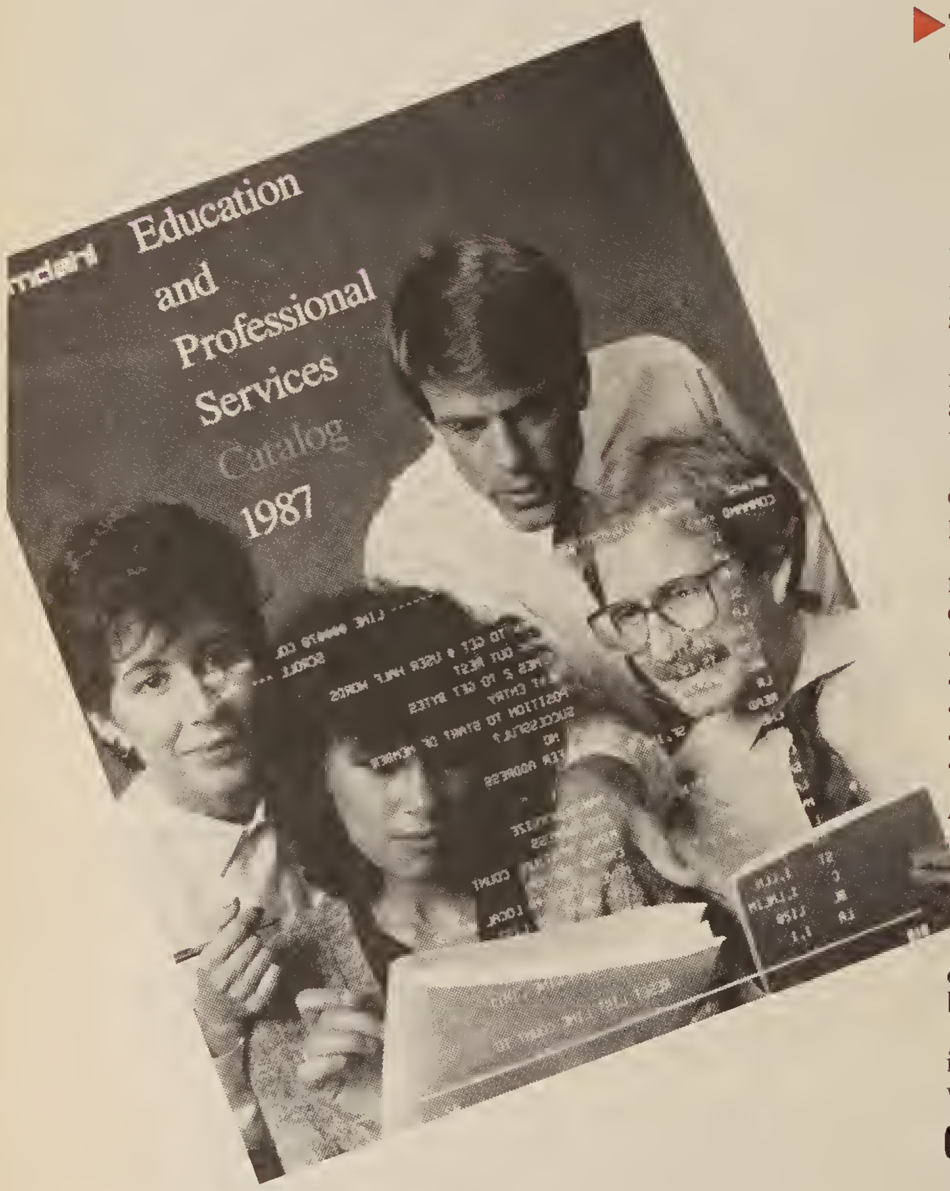
The conversion is done at the Belcastro Data Center, using an IBM 4361 mainframe operating under VM/CMS.

The company uses 1,600 bit/in. tape as its mode of transfer to receive programs to be converted.

All converted programs are compiled with an OS compiler.

The cost of converting and compiling the source code is $1.15 per line of assembler code and $75 per program.

Belcastro Computer Services, 120 Millcreek Road, Niles, Ohio 44446.



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MICROCOMPUTING

SMALL TALK

William Zachmann

IBM looking into Windows

IBM's inclusion of Microsoft Corp.'s OS/2 Presentation Manager graphical interface in its Systems Application Architecture (SAA) adds up to a decisive endorsement of Microsoft's Windows by the biggest and most influential player in the industry.

While the road to the OS/2 Presentation Manager has not been easy, one positive outcome has been the creation of Windows Release 2.0. This product, to be released this fall, mimics the interface of the Presentation Manager and is aimed at bridging the gap between the original Windows and the Presentation Manager.

The evolution of Windows 1.0 into the OS/2 Standard Edition Version 1.1 Presentation Manager involved changes that affect both the graphical user interface and IBM's Application Program Interface (API) for Windows applications. Windows 2.0 will play a key role in this evolution.

Microsoft's original intention was that its MS-DOS 5.0

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Dbase norm sought

Group targets language spanning vendor lines

BY DOUGLAS BARNEY
CW STAFF

If the Dstandards Working Committee has its way, there will be a standard programming language that is integral to both Ashton-Tate's Dbase and a broad range of compatible data bases, compilers and tools.

The goal of the committee is to develop a standard language that will allow applications written in one Dbase-compatible package to run on any other. "From the programmer's point of view, there are dozens of small syntactical differences. They can be very minor, but we are talking source code here," said Marty Rinehart, chairman of the committee and president of Wallsoft Systems, Inc., a Dbase tools vendor.

The committee, which recently met for the first time, is composed of most major suppliers of Dbase-compatible data bases and compilers, including Nantucket, Inc., Fox Software, Inc. and Wordtech Corp. C. Wayne Ratliff, the former Ashton-Tate chief scientist who is currently developing a data base product to be marketed by Migent Software, Inc., is also a member. Ashton-Tate is cur-

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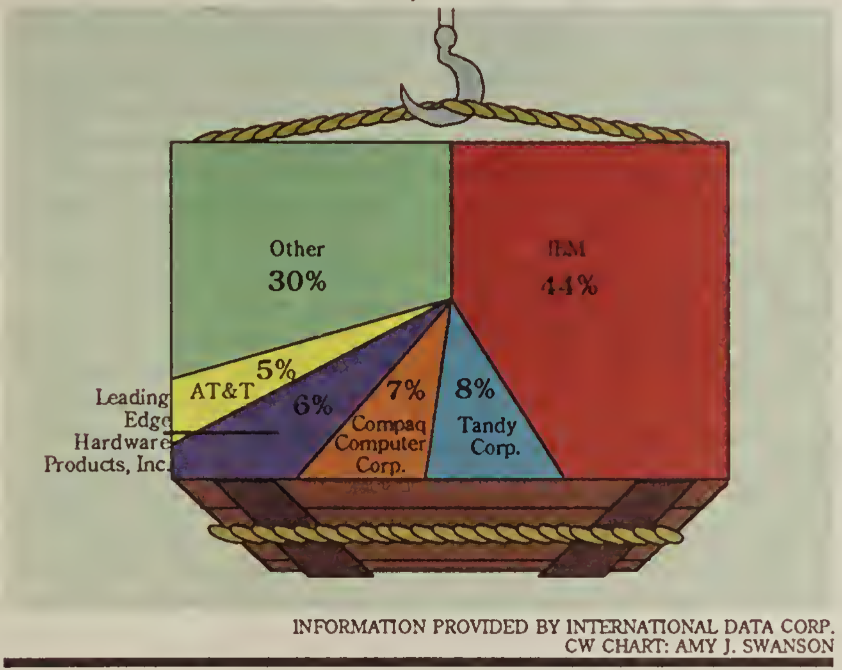
Data View

PC and compatibles shipments

Vendors' shares of 1986 U.S. market



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CW CHART: AMY J. SWANSON

HP exec strives to meet 386, PS/2 challenges

Robert Puette

With the exception of IBM, Hewlett-Packard Co. has sold more personal computers than any other large systems supplier, according to a leading research firm. Many of those approximately one million office and technical PCs have been sold to HP's existing customer base for integration with its HP 3000 minicomputers and other systems.

But now, with an increasingly competitive market and the advent of IBM's Personal System/2, HP faces new challenges.

Robert Puette, general manager of HP's Personal Office Computer Business Unit, recently spoke with *Computerworld* senior writer David Bright about the company's long-term microcomputer strategy.

Is HP developing an Intel Corp. 80386-based version of the its Vectra IBM Personal Computer AT compatible? If so, when might it be introduced?
Yes, 386s are in the cards. I can't say what the timing is going to be right now, but it's not far off.

What do the introduction of the PS/2 and IBM's attempt to set a new personal computer standard mean to HP?
It reinforces a lot of things that Hewlett-Packard wanted and has been heading toward. Not only did they support the next version of [Microsoft Corp.'s] MS-DOS, MS-DOS 3.3, but they also supported [IBM's] OS/2.

Windows. We committed to Windows with Microsoft about two years ago, at a time when IBM was just announcing Topview. We're kind of glad to see that they've finally abandoned that and are going to be supporting Windows. In fact, we're writing a pretty big portion of the next version of Windows in conjunction with Microsoft.

Enhanced video — VGA [IBM's Video Graphics Array]. Basically, we've been pushing like crazy in the video world as well, and we're kind of glad to see them set some standards with VGA. The good news is it helped to set a few [standards]. The bad news is it was a little different from some of the things we were doing. So we're getting

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Inside

- Micropro International steps up effort to gain lost market share with product updates, releases. Page 32.
- An 18 page/min desktop laser printer debuts from Fujitsu America. Page 33.

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Micropro makes push for upgrades

BY DOUGLAS BARNEY
CW STAFF

SAN RAFAEL, Calif. — In an effort to reverse its declining market share that resulted from its paucity of serious product updates, Micropro International Corp. is planning to aggressively update its products and to launch several products related to word processing.

Micropro, which offered its first product in 1978 and once dominated the microcomputer word processing market, has shipped some three million packages worldwide.

But because Micropro's Wordstar received few enhancements, many users began to defect to more modern packages, such as Microsoft Corp.'s Word, Ashton-Tate's Multimate and Wordperfect Corp.'s Wordperfect. Sales for the firm peaked at $66 million in fiscal 1984 but then dipped to $38 million in fiscal 1986.

In order to enhance Wordstar as quickly as possible and reverse its staid image, Micropro recently bought Newword from New Star Software, Inc., a firm founded by two former Micropro employees intent on enhancing Wordstar.

Newword, which had been marketed by New Star, was renamed Wordstar Professional Release 4 and reintroduced in February. Micropro shipped some 100,000 packages in the first 100 days of availability.

New revenue sources

Now the firm said it hopes to continue its rebound by further leveraging its installed base and reaping revenue from both product upgrades and new packages.

While declining to provide many details, company President Leon Williams laid out a series of products and upgrades that are scheduled to be released during the next nine months.

One enhancement that has already been announced is Wordstar CP/M Edition Release 4. This package, aimed at users who still use CP/M-based machines, contains enhancements to the firm's original package for CP/M and is available as an upgrade for $89.

For the mainstream market, Micropro is slated to announce a desktop publishing package at Comdex/Fall '87. The package is being developed in conjunction with Island Graphics Corp.

The firm also plans to release a graphics product early next year to provide "sophisticated manipulation of graphic objects, images and pixels," according to product literature.

As part of its strategy, Micropro said it will release Wordstar Professional Release 5 later this year.

Micropro has 250 employees and $29 million in cash.

HP exec

FROM PAGE 31

that tweaked up, but it's not going to take too long.

The last thing was the 3½-in. floppy support. The best thing I can say there is, *finally.* We've been trying to pursue 3½-in. floppies since time immemorial.

What about a PS/2-compatible machine?

[IBM's] Micro Channel is a different internal architecture. If that becomes a standard, then we will certainly pursue that.

But part of our PC strategy is to pursue the standards that develop in the industry and to add value on top of them.

We don't think that the Micro Channel is just going to instantaneously replace the AT structure.

So whatever we do, it's going to be a bipolar kind of a thing.

Will the Vectra PCs run Microsoft's MS OS/2?

We're certainly committed to the ongoing support of MS-DOS. I put OS/2 into that category. We haven't publicly stated how, what and when, but if you're going to play in the business, you're going to have to play with OS/2.

How does HP's Personal Productivity Center compare with Digital Equipment Corp.'s All-In-1 office environment?

I believe DEC's [All-In-1] is much more host-based. I think we've done a better job of developing the products that run on the PC, like the mail product, the graphics product.

We have a capability for the PCs to transparently access printers on the 3000 [minicomputer] and at the same time utilize a 3000 disk while you're sitting at a PC. You just call it "disk B" instead of "disk A, B or C," and presto, you've got a huge disk.

If you really compare us with DEC in PC integration, feature for feature, we might have a competitive advantage.

What part will networking play in future HP personal computers?

We are very focused on integrating our PCs together with our commercial-based minicomputer systems, which fundamentally are the 3000 family. We're equally pursuing integrating the PC in the technical computer world, which means integrating with our HP-UX [Unix] operating system.

Are diskless workstations with built-in networking capability a possible part of that scenario?

Absolutely. As we get the [local-area network] connections and performance increases, I think we're going to see a lot of those.

Is HP's strategy to provide PC capability to its existing minicomputer base, or is it more open, which means that HP would be competing against not just IBM, but Compaq Computer Corp. and all the different clones?

I do not like to see the competitors' PCs in the HP environment. We've got to do a better job of integration, but we first have to have a very competitive product on a stand-alone basis. And that says we're going to compete in the outside world as well. There's no question about that.

As HP's PCs become more powerful, how will they be positioned against the company's workstations?

We're going to have multiple ways of approaching the problem at the low end. Sun Microsystems, Inc. has dropped its prices dramatically. DEC has gotten lower with its proprietary architectures. And at the same time, you're going to have just a plethora of 386s, very powerful kinds of engines, out there running things like OS/2. I think court's out.

The answer in the office, in the commercial world, is going to be Intel [processors] with MS-DOS and OS/2. The question is, what's going to happen in the technical world? What's the role of OS/2 in some of these powerful industry standard processors going to be, vis-a-vis the [Motorola, Inc.] 68000 and Unix for the low-end workstations? I don't know what the answer to that is going to be.

Frankly, I think that OS/2 and some of these powerful industry-standard processors are going to have a very good shot at that. And if they do, they're going to change that technical workstation marketplace, which is very hot right now. That's going to become a little messy.

HP's 110 Portable includes Lotus Development Corp.'s 1-2-3 and MS-DOS in silicon. Will HP expand on that concept, or does micro software change too fast to make that feasible?

We think that's an interesting concept. We get a lot of requests for those kind of things. I can't tell you what we're going to announce, but I wouldn't preclude that.

Windows

FROM PAGE 31

Windows Presentation Manager (now called the OS/2 Presentation Manager) would be strictly upwardly compatible with Windows 1.0 applications. It didn't work out that way.

An important factor involved requirements from IBM. Circumstantial evidence strongly suggests that IBM initially did not plan to use Windows to provide the graphical user interface for the Personal System/2 and for SAA.

I am reasonably sure that IBM initially planned to build an IBM proprietary graphical interface for the PS/2. Somewhere along the way, however, IBM abandoned its efforts to build such an interface. Presumably, some combination of problems (or simply costs) of internal development led to a reconsideration of Microsoft's Windows as the basis for the Presentation Manager. Even so, in order to sell IBM on Windows, Microsoft had to adapt the original plans to meet IBM's requirements, including changing the user interface and the API.

Regarding the API, it was an IBM requirement that Presentation Manager applications could be written in Cobol and Fortran. But Windows' original design did not accommodate the antiquated and cumbersome linkage conventions of these older languages. Significant changes to the Windows API were therefore required, and strict API compatibiity with Windows 1.0 was sacrificed.

IBM's requirements also dictated changes to the user interface. For the Presentation Manager to be included in SAA, it had to work in ways that could be supported on IBM terminals that did not have, for example, a CTRL key or a keyboard scan that could detect the simultaneous depression of two keys.

Making those changes, however, was a sacrifice Microsoft was willing to make to gain IBM's acceptance of Windows as the basis for the OS/2 Presentation Manager.

Once it was clear that the API had to be changed, Microsoft then took advantage of the opportunity to incorporate other API improvements that Windows software developers had requested. The OS/2 Presentation Manager API now contains more powerful and flexible graphics primitives than those originally built into Windows.

Microsoft Windows 2.0 also incorporates the changes to the user interface, while maintaining upward compatibility with the Windows 1.0 API. It includes additional API calls that support elements of the user interface and ease the transition to the Presentation Manager.

The Presentation Manager, which is unlikely to be available to end users before this time next year, affects the second part of the transition by incorporating a new API that is not compatible with the original Windows API. It will be released by IBM as part of OS/2 Standard Edition Version 1.1.

What all this means for users is that Windows 2.0, running on top of MS-DOS 3.0 and higher, will offer the first opportunity to gain experience with the OS/2 Presentation Manager user interface. It thereby offers the first opportunity to use a key element of SAA.

In fact, with Windows 2.0, Microsoft will start to deliver SAA capabilities well before IBM is able to do so.

Zachmann is vice-president of research at International Data Corp.

Dbase norm

FROM PAGE 31

rently involved with the committee only as an observer.

Industry sources said they believe that Ashton-Tate intends to maintain its market share by controlling the Dbase language, which it was the first to offer. Some committee members threaten Ashton-Tate's market share by optimizing the language for specific uses.

But others said anything that entrenches Dbase as the dominant data base language — including standardization — may help protect Ashton-Tate from the onslaught of competitive products from Microsoft Corp., IBM, Lotus Development Corp. and Oracle Corp. It is still unclear if these vendors will implement a version of the Dbase language within their products.

A host of compilers and compatible packages have emerged in response to Dbase users' demands for added features and performance. For some, the extensions to Dbase have served users well, and a standard would deter progress. For others, however, standardization and compatibility allow users to make better buying decisions.

For many committee vendors, a standard language would provide a marketing boost. "The language vendors will be able to say, 'We have standard Dbase with the following extensions.' It makes it easy for people to switch to another implementation of Dbase," Rinehart said.

While the committee apparently hopes to standardize Dbase, Ashton-Tate will maintain responsibility for pushing the language forward. "Whatever Dbase comes out of Ashton-Tate goes a long way toward becoming a standard," Rinehart added.

NEW PRODUCTS

Systems

An IBM-compatible line of personal computers has been announced by **Delta Computer Corp.**

The line includes the **Delta A**, an Intel Corp. 80286-based IBM Personal Computer AT-compatible complete with a 12-in. flat-screen monochrome monitor, a set of integrated software applications, monochrome graphics adapter card and documentation.

The **Delta TX** is an Intel 8088-2-based computer. It is said to be IBM PC XT-compatible with 640K bytes of random-access memory, two 5¼-in. disk drives, six full-size expansion slots, the application software packages and a Hercules Computer Technology, Inc.-compatible monochrome graphics card.

Delta A costs $1,995. Delta TX costs $1,095 with a monochrome monitor, $1,395 with a color monitor and $1,595 for a 20M-byte hard drive system.

Delta Computer, P.O. Box 809, 260 Forbes Blvd., Mansfield, Mass. 02048.

Software utilities

A collection of symbols and artistic images designed for use with Microsoft Corp.'s Windows has been introduced by **Micrografx, Inc.**

CAD Clipart Version 1.0 contains more than 1,000 images. The images are compatible with Aldus Corp.'s Pagemaker; Micrografx's Windows Draw, Windows Graph and Inavision; Microsoft's Windows Write and Notepad; and Palantir Software, Inc.'s Filer data base program. The object-based images can be output at the maximum resolution of the device used.

CAD Clipart Version 1.0, including a directory with tips for using clip art, costs $99.95.

Micrografx, 1820 N. Greenville Ave., Richardson, Texas 75081.

Software enhancements

IMRS, Inc. has released a local-area network-ready version of its **Micro Control** personal computer-based financial information system.

Micro Control 3.0 includes file sharing and locking capabilities, administrative controls, password protection, multiple security levels and audit trails. Account capacity has been expanded to 4,000 accounts and 99 categories of data.

Micro Control is priced from $80,000 to $120,000.

IMRS, 1033 Washington Blvd., Stamford, Conn. 06902.

Data storage

Tecmar, Inc., a subsidiary of Rexon, Inc., has expanded its **Qualitytape** family of ¼-in. cartridge tape systems.

Four tape systems with capacities ranging from 40M to 90M bytes have been added to the line, as well as Tecmar's QTOS software and standard and minidata cartridge media. The QTOS software includes direct track-seek features. It supports multiple-tape backup and is said to be compatible with local-area networks from vendors such as Novell, Inc. and IBM.

All Qualitytape subsystems are offered in both internal half-height and external portable configurations. Prices range from $795 to $2,495.

Tecmar, 625 Cochran Road, Solon, Ohio 44139.

Printers/Plotters/ Peripherals

A desktop laser printer said to operate at 18 page/min at 300 dot/in. resolution has been announced by **Fujitsu America, Inc.'s** Computer Products Group.

The **M3727MA** printer was designed to print 25,000 sheets per month. It features two 250-sheet cassettes and emulates Epson America, Inc.'s FX80, Diablo Systems, Inc.'s 630 and Hewlett-Packard Co.'s Laserjet Plus. It comes standard with 1M byte of random-access memory, expandable to 2M bytes. Standard host interfaces include RS-232 and Centronics Data Computer Corp. parallel.

The M3727MA laser printer is priced at $7,950.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

Board-level devices

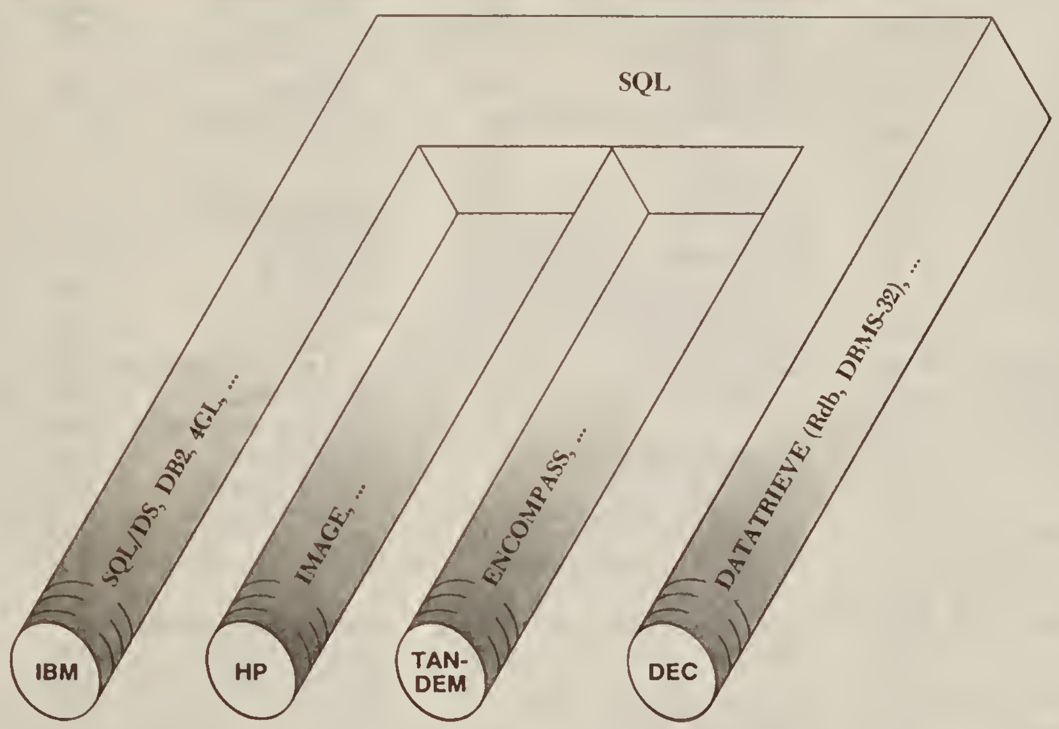
Three video display adapter controller boards for IBM Personal Computers and compatibles have been announced by **Paradise Systems, Inc.**

The **Autoswitch Monochrome EGA Card** allows users to run IBM Enhanced Graphics Adapter (EGA) color software on monochrome monitors. The card replaces 16 colors with 16 shades of gray, green or amber. It supports the Hercules Computer Technology, Inc. Monochrome, Monochrome Display Adapter (MDA) and IBM Color Graphics Adapter (CGA) standards.

The **Basic EGA Card** displays applications in EGA, Hercules Monochrome, CGA and MDA resolution without automatic switching.

The Monochrome EGA Card and the Basic EGA Card cost $249 each.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.



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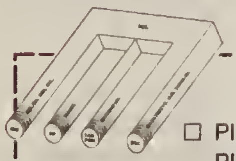

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   - 40 Wholesale/Retail/Trade
   - 50 Business Service (except DP)
   - 60 Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/Transportation
   - 70 Petro Chem, Mining, Construction, Agriculture
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. DP Service Bureau/Software/Planning/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75 User Other ______
   - 95 Vendor Other ______

   (Please specify)

2. TITLE/FUNCTION (Circle one)

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   - 19 Vice President Asst VP
   - 21 Dir Mgr , Suprv , IS/MIS/DP Services
   - 22 Dir , Mgr , Suprv , of Operations, Planning, Adm Services
   - 23 Dir , Mgr , Suprv , Analyst, of Systems
   - 31 Dir , Mgr , Suprv , of Programming
   - 32 Programmer, Methods Analyst
   - 35 Dir , Mgr , Suprv , OA/WP
   - 38 Data Comm Network/Systems Mgt

   OTHER COMPANY MANAGEMENT
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   - 12 Vice President/Asst VP
   - 13 Treasurer, Controller, Financial Officer

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   - 41 Engineering, Scientific, R & D, Tech, Mgt

   SALES
   - 51 Manufacturing Sales Reps , Sales/Mktg Mgt

   OTHER PROFESSIONALS
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   - 70 Medical, Legal, Accounting Mgt
   - 80 Educators, Journalist, Librarians, Students
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   (Please specify)

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   Types of equipment with which you are personally involved either as a user, vendor or consultant.
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NETWORKING

DATA STREAM

Patricia Keefe

Unkinking cable wars

There's so much hubbub crisscrossing the networking community these days regarding what constitutes the perfect transmission medium. Its attributes are said to include low cost, accessibility, flexibility and resilience in the face of noise and other distortions. Feeding those discussions are the advent of proprietary cabling systems and the current trend toward moving high-speed networks over to unshielded twisted-pair wiring.

Invariably, one subset of this discussion will address whether users really care about or want to know about cabling choices. Indeed, many vendors, consultants and analysts subscribe to the notion that users do not. Nothing could be further from the truth. Users care all right — plenty. Cabling can be pretty expensive, especially if it is discovered later that the installed wiring won't work with a second, different network or private-branch exchange system.

An informal discussion earlier this year with attendees at a

Continued on page 40

More big players bet on TCP/IP

Vendors rush to connect PC LANs, host-based corporate systems

BY ELISABETH HORWITT
CW STAFF

ANALYSIS

The proposed merger of 3Com Corp. and Bridge Communications, Inc. [CW, July 27] swells the ranks of local-area network (LAN) vendors that perceive interconnectivity of IBM Personal Computer-based LANs and host-based corporate communications systems as the new hot spot in networking.

Many of these LAN companies offer Transmission Control Protocol/Internet Protocol (TCP/IP) as an interim solution that may be replaced by a mature Open Systems Interconnect (OSI) standard.

Bridge archrival Ungermann-Bass, Inc. in Santa Clara, Calif., already provides a link between the IBM PC network environment and TCP/IP that incorporates the TCP/IP-IBM Netbios interface standard developed at a Monterey, Calif., TCP/IP workshop held earlier this year. Ungermann-Bass also has announced plans to migrate its network boards to OSI.

This summer, Micom-Interlan, Inc. has unveiled a product strategy revolving around interconnectivity; Sytek, Inc. plans to follow suit.

Micom-Interlan, which has languished in parent company

Continued on page 40

Survey: DEC still can't topple SNA

BY ELISABETH HORWITT
CW STAFF

Despite industry consensus that Digital Equipment Corp. has led competitors — including IBM — in networking capabilities during the past two years, Decnet has failed to oust IBM's Systems Network Architecture (SNA) as the primary networking backbone system in many Fortune 1,000 corporations, according to a recent survey.

Of the 150 Fortune 1,000 companies surveyed, only 23% had installed Decnet, while 78% had installed SNA (see chart below), said Forrester Research, Inc., a market research firm based in Cambridge, Mass. Only 16% of those surveyed cited DEC as their primary data network vendor, while 73% cited IBM, the survey found.

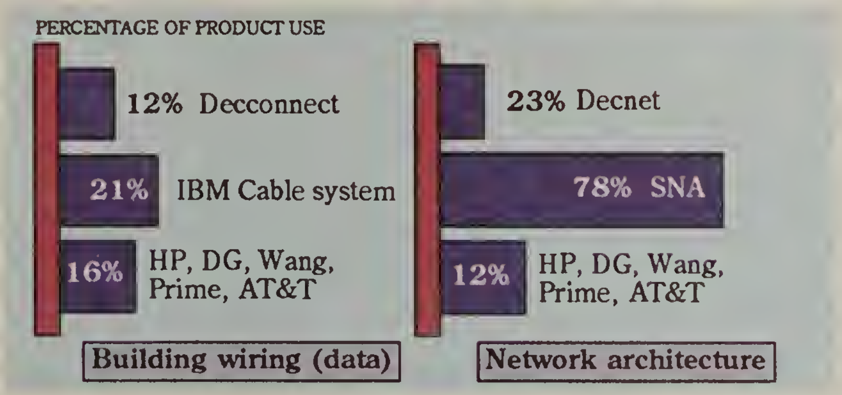
"We were surprised to see so few Decnets," Forrester President George Colony said.

IBM also appears to be creeping up on DEC in the local-area network arena, the survey found. Of the companies surveyed, 33% said they had installed Ethernet, which supports a variety of other networking systems in addition to Decnet. IBM's Token-Ring had been installed in 22% of the surveyed companies. Data General Corp., Hewlett-Packard Co., Wang Laboratories, Inc., Prime Computer, Inc. and AT&T networks

Continued on page 40

DEC's Fortune 1,000 network penetration

IBM's SNA wins out as backbone system for most companies



INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

Station monitors large nets

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. last week announced network management for large-scale Transmission Control Protocol/Internet Protocol (TCP/IP) networks, along with an internetwork bridge said to support a mix of T1 and other point-to-point links.

The NCS/2 Network Control Server is an integrated network management workstation that allows centralized control and monitoring of devices attached to TCP/IP-based Ethernet or Bridge 5M-bit broadband networks, the vendor said. It provides features critical to the administration of large networks, Bridge claimed, including logging of all network activity on a system audit trail, monitoring of

Continued on page 40

Inside

- Boston Software program exchanges information between disparate applications. Page 40.
- Gateway Communications cuts price of G/Net adapter card. Page 41.
- Datacopy's Jetfax provides PCs with data communications, image network features. Page 41.

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Program links disparate applications

BY DAVID BRIGHT
CW STAFF

SHERBORN, Mass. — Boston Software Systems, Inc. recently unveiled a package said to eliminate the need to rekey data by exchanging information between disparate applications on personal computers, minicomputers and mainframes.

The Boston Access program resides on an IBM Personal Computer and is a sophisticated macro, not a file transfer program, said company President Sara McNeil. The package works with vertical applications, many of which do not conform to popular file transfer formats.

"There are some programs which will put files in [Lotus Development Corp.] and other formats. This is for those situations where you don't have that capability," McNeil said.

Before using the program, users must build custom interfaces with the program's scripting language.

Information exchange

The $99 program accomplishes the transfers by reading data directly from the screen buffers of one application and inserting the data into the keyboard buffers of another. Transfers can be made in batch mode without operator intervention. The program exchanges data between programs running on an IBM PC or between a PC application and an application accessed through terminal emulation, according to the vendor.

A hospital beta-test site is currently using Boston Access to coordinate the flow of information between a custom IBM PC application and an application on an IBM 4300 mainframe. The microcomputer program analyzes data for patient billing, while demographic and other information is kept on the mainframe. Information must be exchanged between the two programs on a regular basis. "Before, they were rekeying that information in," McNeil said.

For $550, the firm also offers Boston Access Plus, which includes advanced terminal emulation and the ability to read files.

Survey

FROM PAGE 35

had been installed in 17% of the companies surveyed.

"I had almost written Token-Ring off," Colony said, "but IBM has fixed a lot of the problems and failures, like boards dropping tokens." In the future, he said, firms are likely to install Token-Ring, Ethernet or AT&T's Starlan, building gateways to connect network architectures when necessary.

In order to continue its growth and success in networking and computing, DEC must provide greater connectivity to both SNA and other computing environments, such as AT&T's Unix System V and Microsoft Corp.'s MS OS/2, Colony said.

DEC's support of the Open Systems Interconnect (OSI) standard, coupled with IBM's commitment to provide gateways between SNA and OSI, will mean that "SNA and Decnet come together under OSI," Colony said. However, IBM's Netview will become an effective competitive weapon against DEC, Colony predicted.

"DEC told me that they would have a distributed network management system in which [DEC] VAXs would suck network alerts out of Netview. About 40 Fortune 1,000 companies we talked to [apart from the survey] thought that was a bad idea," Colony said.

In the area of premises wiring, the survey found that Decconnect had been installed in only 12% of the companies surveyed, while 21% of these firms had implemented IBM's Cabling System (see chart page 35).

TCP/IP

FROM PAGE 35

Micom Systems, Inc.'s shadow since its acquisition in 1985, has devoted a large percentage of its research and development budget to this area in hopes of regaining lost market presence.

Sytek, which struggled all last year to replace revenue from a discontinued OEM deal with IBM, hopes an expanded share of the interconnectivity market will help it regain profitability.

Micom-Interlan seeks to form a bridge between its older line of Ethernet controllers for large systems such as Digital Equipment Corp. hosts and various LAN environments designed to link workstations within small task groups, company President Michael Barker said. Micom-Interlan is positioning its TCP/IP — and in the future, its OSI products — as the solution for corporations that want to interconnect incompatible LANs within their work groups.

With this in mind, the Micom subsidiary has been porting its TCP/IP device drivers to a variety of computer buses — including IBM's Micro Channel — and to additional network environments, such as AT&T's Starlan. The company has aggressively sought joint development agreements that will implement its products on popular systems.

For example, Micom-Interlan recently staked a claim in the AT&T Unix System V, Release 3 connectivity market by embedding its TCP kernel into Interactive Systems, Inc.'s AT&T-certified implementation of that operating system on the Intel Corp. 80386 processor. As a result, Micom-Interlan's TCP/IP devices will work with all Unix System V, Release 3 software products based on Interactive Systems' offering — including an integrated Xenix-Unix System V, Release 3 system being developed by Interactive Systems and Xenix developer Microsoft Corp.

The PC LAN industry has been a special target for the Micom subsidiary. In September, Novell, Inc. is expected to offer a TCP/IP gateway for its Netware developed by Micom-Interlan. Micom-Interlan has a similar arrangement with Banyan Systems, Inc. 3Com's merger with Bridge, however, has pretty much decided whose TCP/IP products it will be using.

Sytek, meanwhile, plans later this summer to unveil a baseband TCP/IP Ethernet product line as a low-cost way for users to link workstations to its existing broadband terminal-to-host network, the System 2000, said Sytek President George Klaus.

"Our analysis showed that the System 2000 only targeted 6% of the total U.S. network market for very large installations," Klaus said. By adding a baseband Ethernet product, Sytek can address a niche that forms 26% to 28% of the interconnectivity market, he added.

Initially, Sytek plans to market its baseband products to its existing broadband customers, Klaus said. The two types of networks can work together as one system, called Globalnet. "We're technically not doing anything unique in baseband TCP/IP, but we think we provide unique ways of hooking baseband networks to a high-speed broadband backbone," he said.

Workstation

FROM PAGE 35

key network parameters in real-time, multiwindowing and graphical data analysis to determine network trends and problems. The NCS/2 software runs as an application under Sun Microsystems, Inc.'s Unix.

Based on Sun's Sun-3 graphics workstation, the NCS/2 supports up to 4,000 Bridge servers on networks featuring from 1,000 to 16,000 users. One of two models of the NCS/2 is the NCS/2-140, which is based on the 16-MHz 32-bit Motorola, Inc. 68020-based Sun-3/140 CPU. It offers a 140M-byte drive, 2 million instructions per second (MIPS) and support for up to 2,000 Bridge servers. A turnkey unit costs $45,000.

The second model, the NCS/2-260, is based on the 25-MHz 32-bit 68020-based Sun-3/260 CPU and offers a 280M-byte drive, 4 MIPS and support for up to 4,000 Bridge ervers. A turnkey unit costs $85,000.

Bridge's Internetwork Bridge/3 is a data link-level product said to create a single, logical Ethernet unit that can transmit data between networks running any higher level protocols. It supports up to eight lines and the use of multiple synchronous-interface types and costs $10,500 with one T1 card.

Cable wars

FROM PAGE 35

regional meeting of the New England Chapter of the Data Communications Users Association revealed that a major concern for many MIS directors is cabling. Yes, cabling.

A number of these users indicated they were either in the process of moving to new buildings or faced rewiring their current site. And they were mighty confused about which side to take in the cabling wars. The big fear, they said, was that whatever they chose today would be obsolete five years down the road.

They'll take twisted-pair

Still, these particular users were unwilling to shell out big bucks for the so-called cable of the future — fiber-optic media — preferring to wait for pricing to drop further. Most intend to stick with good old twisted-pair wiring until the dust clears. That's right, telephone wire.

But what the heck. It's commonplace, it's already there and it's cheap. What's more, it's compatible with AT&T's 1M-bit Starlan and Premises Distribution System, and certain forms are compatible with IBM's 4M-bit Token-Ring network. Even Ethernet is available, albeit at low speeds, over lowly twisted-pair wiring.

The plethora of cheap twisted-pair wire has prompted at least two companies — 3Com Corp. and Synoptics, Inc. — to work on separate projects designed to bring 10M-bit Ethernet to twisted-pair wiring — no small feat — by year's end. Some observers say 3Com, which uses expensive coaxial baseband cable for its Ethernet networks, is turning to twisted-pair wiring to overcome resistance in some sites to pulling coaxial cable.

Any excitement generated by these projects could be premature. Users need to be careful. First of all, if the twisted-pair wiring in your building is more than 10 years old, it probably needs to be replaced.

There are several different kinds of twisted-pair wiring, and the wrong cable will tie networks in knots. There are two-, four- and six-pair; there's shielded (Types 1 and 2) vs. unshielded (Type 3). The big issues often cited with this media are speed, distance and distortion. Another concern is, How do you separate voice and data signals running over the same wire? Have 3Com and Synoptics addressed these areas?

The rule of thumb in cabling is the higher the speed, the shorter the distance. Generally speaking, twisted-pair wiring is said to carry the least amount of data, have the lowest transmission rate and be the most susceptible to electromagnetic interference. It also carries data over longer distances, which can be disastrous to a high-speed network.

A design of the times

3Com and Synoptics have to come up with a design that prevents deterioration of data packets traveling at high speeds over a distance of at least 150 feet — the average distance between the corporate desktop and the wiring closet. Peaceful coexistence of voice and data will keep both MIS and telecom managers happy.

But design options are inhibited by the need to keep costs down so as not to negate one of the compelling reasons for going with twisted-pair wiring in the first place. Even trickier for 3Com, which cannot rely on a direct sales force, is the need to build a truly user- or dealer-installable product.

Many users, and the industry in general, will be watching closely to see what these two vendors unveil at the end of the year. Successful products will reinforce decisions to stick with twisted-pair wiring for at least the near future and possibly prolong the life span of that media. A flop can only mean more and more users will bite the bullet and go with fiber optics, a popular choice already among users of Proteon, Inc.'s high-speed token-ring networks. And Proteon execs say fiber isn't a thing of the future — it's here today.

In either case, whether 3Com and Synoptics are successful or not, users will be watching closely.

Keefe is a *Computerworld* senior editor, networking.

NEW PRODUCTS

Local-area network hardware

Gateway Communications, Inc. has reduced the price of its **G/Net** network adapter card.

G/Net supports up to 255 IBM Personal Computers, PC XTs, ATs and compatibles over a baseband, coaxial-cable linear-bus network. The G/Net network adapter, called the Local Network Interface Module, features an on-board coprocessor with 64K bytes of random-access memory. It supports Novell, Inc.'s Netware as well as communications servers for IBM's Systems Network Architecture, CCITT X.25 and asynchronous gateways and bridges.

The G/Net network adapter card now costs $395.

Gateway Communications, 2941 Alton Ave., Irvine, Calif. 92714.

Customer-premise equipment

Jetfax, designed to provide any standard personal computer with data communications, image network features and the functions of a Group III facsimile machine, has been introduced by **Datacopy Corp.**

The product consists of Datacopy's Microfax facsimile board, its Jetreader scanner and a PC interface board. It gives users PC-to-fax, fax-to-PC and PC-to-PC communications access. The PC-to-PC communications feature consists of the capability to send and receive ASCII data, printed text, images or text and images.

Features of the Microfax board include background operations, multiple addressing, delayed transmission and store-and-forward capabilities.

Jetfax is priced at $2,790.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

Links

Adapt3274 RJE, software said to allow IBM Personal Computers to communicate with mainframes using the 3770/remote job entry (RJE) protocol via a 3274/3174 controller, and **Adapt3274 IDS**, software said to allow an IBM PC to emulate an IBM 3278/9 Information Display Station, have been announced by **Network Software Associates, Inc.**

Adapt3274 RJE allows IBM PCs to perform batch data transfers to and from a mainframe. The controller may be connected to the host via a local-channel attach or via a remote communications link. It reportedly offers concurrent background mode, multiple mainframe sessions, file-transfer program and printer spooling.

Adapt3274 RJE costs $985. Adapt3274 IDS costs $585.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

File servers

Forest Computer, Inc. has enhanced its Gateway/1000 product for use with Digital Equipment Corp. VAX computer systems.

The Gateway/1000 now allows VAX systems in a Decnet networking environment to perform bidirectional file transfer and terminal emulation and to have printer access with either Hewlett-Packard Co. HP 3000 minicomputers or IBM mainframes.

Gateway/1000 hardware and software prices begin at $18,000 and $16,000, respectively.

Forest Computer, 1749 Hamilton Road, Okemos, Mich. 48864.

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NDM notifies both data centers and provides complete statistics and audit trails.

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The completed transfer can automatically initiate an application or pass control to a job scheduler, such as UCC-7.

How is the data kept confidential?
NDM prevents unauthorized access and reports on unsuccessful attempts. It also supports ACF2, RACF and TOP SECRET security systems.

What types of NDM products are available?
NDM-MVS (SNA and HYPERchannel versions), NDM-VSE and NDM-PC. They're all part of a family of data transfer products that will soon include NDM-VM and NDM-VMS.

NDM products are being used by more than half of the nation's largest financial institutions and a who's who of Fortune 500 companies. Because they believe nothing should stand in the way of results. Not even their own data centers. If you feel the same, call 1-800-292-0104. In Texas, call 214-550-0318.

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SPOTLIGHT

COMMUNICATIONS SOFTWARE

Communications is about to become a great deal more complicated, as a stream of fresh developments challenges some long-held assumptions about the way connections work.

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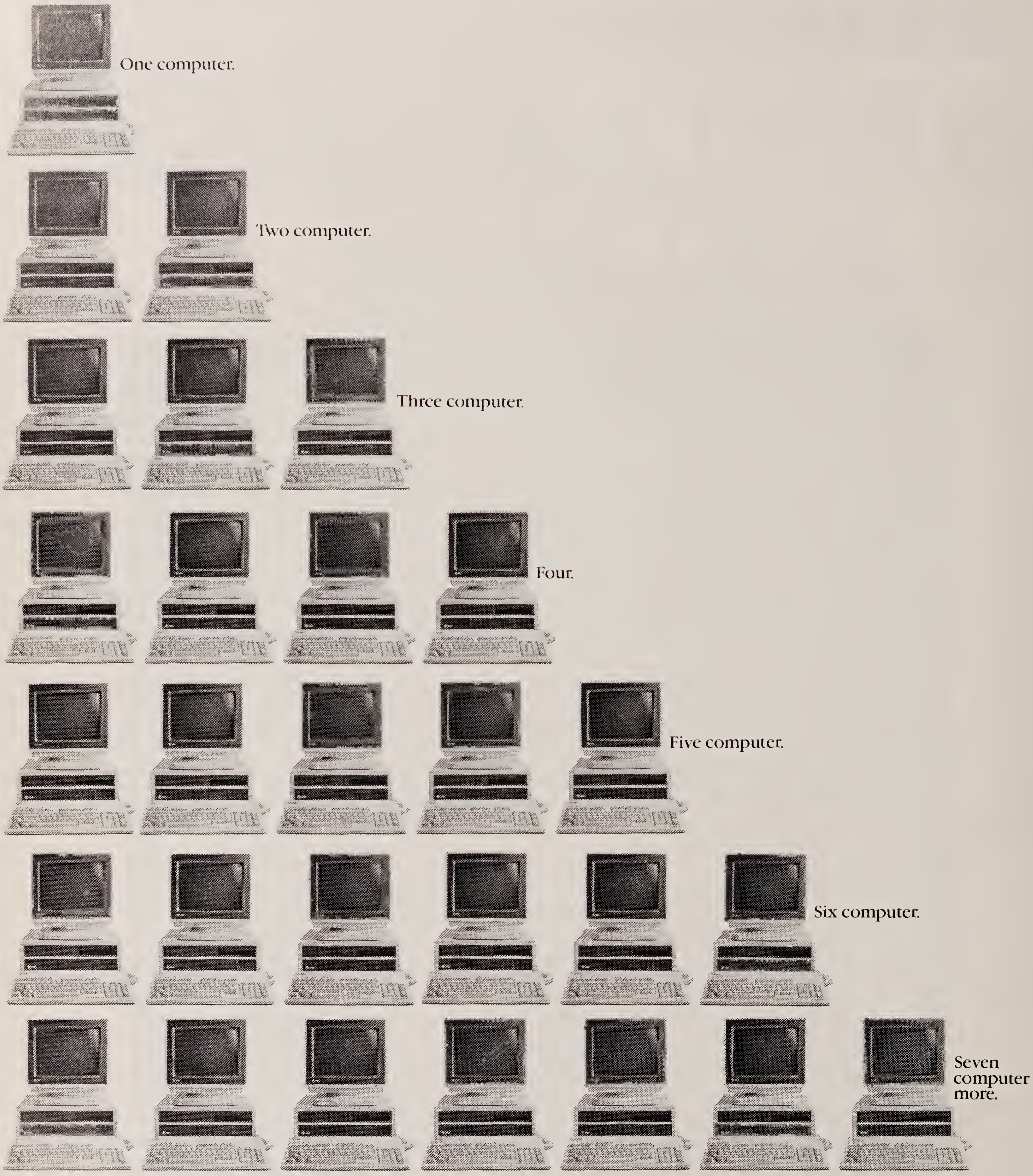

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It will soon be apparent that communications is not a separate application but a structure supporting every type of data movement.

FINDING ORDER IN THE CHAOS

BY DANIEL GROSS

PAUL MEISEL

The role of software in data communications has recently gone through some important redefinitions. There was a time when hardware was expected to do nearly everything, and communications software was relegated to playing a utility role, such as getting data from a disk onto a wire. As development tools improved, however, it became apparent that software could also perform terminal emulation, protocol conversion and file compression — all the tasks previously assigned to black boxes. What we have now is a state of logical balance, which recognizes that each method exhibits its own particular strengths. Hardware does certain things — such as protocol conversion — more effectively than software and at a similar cost. Software, on the other hand, is more easily modified; it is better able to play chameleon, emulating an ever-increasing variety of terminals.

It is fortunate that the data communications industry has finally come to an agreement on the relative merits of hardware and software, because great changes are rushing in on communications systems like a howling Chicago wind, and the imminent confusion will leave no time to solve leftover problems. Development is moving more quickly than the user community's ability to assimilate new technologies, with the strongest currents concentrated on three fronts — personal computer software, host systems and micro-to-mainframe connections. This last area is a subset of the notorious and ill-defined issue of connectivity, to be discussed later.

Fundamental design assumptions behind PC communications software are changing as quickly as the features listed on the latest packages, which says a great deal, since one of the most explosive phenomena in recent data communications history has been the software's exponential growth. Gone are the days when Crosstalk, the original and dumb, terminal- and file-transfer program from Microstuf, Inc. in Roswell, Ga., shared with Ashton-Tate's Dbase II the honor of being perceived as a "serious" software program for microcomputers that ran on Digital Research, Inc.'s CP/M operating system.

Now, the PC software market is crowded, and things are not quite so simple. Danbury, Conn.-based VM Personal Computing, Inc. offers Relay Gold, a package that among other things, sends and receives files simultaneously in the background while the PC user runs another program. Relay can also emulate an IBM 3270 terminal. Microsoft Corp. includes a script language in its Access software that is as sophisticated as Basic.

The writing on the bulletin board

Until recently, PCs in communications were seen as no more than smart terminals. Their low cost, however, spawned a civilian kind of host system — the bulletin board system. Bulletin-board system operators use special software to make their PCs act as host systems. The two main services found on these systems are electronic mail and public-domain software distribution.

The development of bulletin-board system software is beginning to have considerable

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Gross is chairman of Magnetic Press, Inc., a New York-based research and intelligence firm specializing in the computing and telecommunications industries.

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impact on new communications programs. Originally, a PC could act like a host using the answer mode of software like Crosstalk, Relay and Access. Products appearing on the market were intended exclusively for host/bulletin board system applications. Some of these programs are still in the public domain.

Microstuf's Remote software represents a new type of product, one on which the use of the PC as a host is not intended primarily for E-mail. Users can call a PC running Remote and employ applications as if they were sitting at the PC's keyboard — albeit at the slower speed enforced by a modem. Remote can also be used as a dial-up gateway into local-area networks (LAN), allowing isolated remote users to share network resources and exchange data.

Another package similar to Remote has an even more specialized purpose: complete remote control of a PC. Newport Beach, Calif.-based Meridian Technology, Inc. recently released Carbon Copy Plus, a package that mirrors every action a user takes on two connected PCs. A copy of Carbon Copy Plus must be running on both machines, a feature that has made it popular among custom-software developers as part of their service contracts.

MAJOR COMPUTER manufacturers, each convinced that its own way is better than the others, have spawned an entire industry that tries, through communications, to undo what it has wrought through competition.

"Both sides of the Carbon Copy equation help," says Dan Seltzer of Daniel Seltzer & Associates, a Brooklyn, N.Y.-based software consulting firm. "We can give our customers instant technical support and problem solving while drastically reducing our number of on-site visits."

Host software

Remote access and host software available for larger systems is primarily oriented toward electronic mail. On-line Software International, Inc. in Fort Lee, N.J., has been selling Bulletin, its mainframe E-mail software product, since October 1986.

Bulletin offers a feature increasingly common in E-mail: Users can choose to receive their mail in a store-and-forward fashion or be interrupted in the middle of an application if new mail arrives.

Metropolitan Life Insurance Co. says it has been using Bulletin to great advantage. The company has a distributed network of IBM mainframes supporting more than 3,000 terminals across the U.S. In the 1970s, Metropolitan Life decentralized processing, but policy records remained situated in the home office in New York.

"The logistics of distributing several million paper files, occupying two floors, were too difficult to implement," says John Kador, a Chicago-based mainframe software specialist.

According to Kador, Metropolitan Life was using a telex-based system until it moved to Bulletin, and equipment breakdowns made the system less than reliable. Steven Berto, Metropolitan Life's project manager responsible for the E-mail implementation, claims the new system is saving the company more than $100,000 per year.

Countrywide net

One of the most remarkable examples of messaging systems developed outside the nests of academia and corporate America is Fidonet. Fido is a host/bulletin board system for PCs that offers standard features such as E-mail, menu creation, editing software for system operators and file transfer with a choice of popular protocols. Fidonet is the name for both a loosely knit organization of Fido bulletin board systems operators and a particular feature of Fido software.

If properly configured, Fido will shut down its host operations at predetermined times — typically between 3 a.m. and 5 a.m. — and call other Fido systems locally and across the country to forward E-mail. With this system, Fido users in New York, for instance, can send E-mail to users of a San Francisco Fido bulletin board system for the cost of a local call.

The success of bulletin board system software has inspired some vendors to produce similar applications for LAN environments. PCC Systems, Inc. in Palo Alto, Calif., developed CC:Mail exclusively for in-house LAN-based E-mail requirements.

In the LAN environment, the file server plays the role of the host. CC:Mail allows the creation and editing of text and graphics. In addition, messages can be sent, forwarded, broadcast or similarly manipulated. The product's effort to mimic traditional means of carrying out a task — in this case, sending and receiving conventional mail — marks CC:Mail as a prototype for communications software of the future.

Micro-to-mainframe link

Most new communications software involves connections between small and large systems. This is most apparent in the evolution of micro-to-mainframe links.

Digital Communications Associates, Inc. in Norcross, Ga., made its name with the Irma card, which provides a straightforward coaxial-cable connection to an IBM 3274 cluster controller. Many other vendors followed in DCA's footsteps, but the market shifted unexpectedly when users were disappointed with the limitations of these links. IBM's LAN-based Systems Network Architecture (SNA) gateways changed the rules of the game.

Whereas in single PC cards the micro-to-mainframe link cannot be shared as a resource, this is possible with LAN gateways. LAN vendors are also better positioned to offer a seamless environment, providing access to the mainframe as well as to the LAN.

Software like VM Personal Computing's Relay line and the SIM3278 programs from Ottawa, Ontario-based Simware, Inc. gives users more flexibility in selecting the underlying hardware. With Relay Gold or SIMPC, you can do without any hardware on the PC end, using protocol converters attached to the host mainframe.

Simware's product line allows dumb ASCII terminals to be used instead of IBM's expensive 3270s. The cost difference between 3270 and dumb ASCII terminals can reach $1,200.

Incompatibility gap

The single most important gap communications software can bridge today is not physical distance but what can only be called the chasm of incompatibility.

Major computer manufacturers, each convinced that its own way is better, have spawned an entire industry that tries, through communications, to undo what it has wrought through competition. This industry sells multivendor connectivity.

Two major groups of standards are competing for dominance in communications: IBM's SNA and the Open Systems Interconnect (OSI) scheme promoted by the International Standards Organization (ISO) and the Consultative Committee on International Telephone and Telegraph (CCITT).

Many large players are presumably going with SNA on the belief IBM will have to provide some upgrade path from its own standards to the international ones. Understandably, these vendors perceive IBM as a more

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Telecommuting makes information a movable feast

BY THOMAS CROSS

By whatever name it is known — remote work, home office work, telework, location-independent tasks or home distributed data processing — telecommuting means one thing: performing job-related work at a site away from the office and electronically transferring the results to the office or another location. Although many jobs can be completely handled in this manner, telecommuting is most widely used to supplement normal office activities.

Spurred by the vast array of sophisticated new communications and computerized equipment, the business world is extending the communications networks of its automated offices to include the telecommuter.

As manufacturers enhance such features as memory, hard-disk storage, graphics displays, personal computer-based video teleconferencing and applications software, PCs are becoming increasingly valuable for remote work. Applications software can provide financial analysis as well as job- and industry-specific programs.

Small, portable PCs sporting a growing number of features are exerting a special influence on the growth of telecommuting. Because many models fit easily into a briefcase, people are able to leave noisy, congested city areas early to work at home in the evening. Portables also permit the occasional off-site worker to become accustomed to telecommuting.

Executives of banks, brokerage houses, insurance companies and similar service companies who must occasionally work at home often buy a computer to do so and then approach their companies to secure remittance for the purchase.

Modems with smarts

Communications software emerged as a response to the demand for easier networking with smarter modems. On-line data base, electronic mail and computer time-sharing sparked the need for rapid logons to multiple systems.

In the old days of dumb modems, one could spend the better part of an evening dialing the phone and going through all the logon names, passwords and commands only to discover that there was no new mail. Often, more than 100 keystrokes were needed to get through the telephone, the packet network, computer security and the special commands needed for each system.

Also driving the development of communications software was the integration of modems into personal computers. With internal modems, software was needed simply to locate the user's modem. But beyond that, communications software also allowed the user to convey special instructions to the modem and use the disk storage to save files and keystrokes, as well. Tasks that used to take up to 1,000 keystrokes can now be accomplished with only one.

There are also many communications software packages that will "fetch the newspaper" from different electronic mail systems and deposit responses.

On the growth path

Communications software has become highly sophisticated in a short amount of time, with feature-rich parameters for network dialing, waiting, dial-tone detection, delayed dialing (to save telephone charges and take advantage of late-night computer time-sharing discounts), off-line editing and the ability to design your own keywords.

Further development of communications software is headed in many directions, thus blurring the difference between local and remote computer systems. The creation of expert systems may automatically provide preprogrammed responses to certain types of messages and may blur the distinction as to who wrote the message.

At least one manufacturer is bringing together facsimile capability with scanning features and modems to solve many of the issues related to the types of documents that flow in and out of the office.

The next logical step for communications software packages will be the incorporation of artificial intelligence technology. The day may not be far off when software will not be used simply to connect users but to actually help them analyze their communications. •

Cross is vice-president of Cross Information Co., a software development and research firm in Boulder, Colo. He is co-author of *Telecommuting: The Future Technology of Work* with Majorie B. Raizman.

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viable bandwagon than standards organizations that have no direct impact on the industry or the market.

Eastman Communications Co. (Eastcom), a wholly owned subsidiary of Rochester, N.Y.-based Eastman Kodak Co., has chosen the SNA route. Eastcom's software product Syncra links PCs, IBM's System/34, 36 and 38 and mainframes and Digital Equipment Corp.'s Microvax, VAX and PDPs. Its features are characteristic of software that is used for multivendor networking.

Syncra supports file compression and decompression to minimize file-transfer times. It is data transparent, so binary code or files using different character sets can all be transferred. Most important, Syncra can also pick up file transfers where it left off if a line failure interrupts transmission.

Protocol of one's own

As are an increasing number of communications packages that must deal with a wide range of architectures, Syncra is exclusively a file-transfer program. It does not offer features like terminal emulation. Also, like Relay Gold and the Simware line, Syncra uses a proprietary file-transfer protocol.

Ed Sterling, vice-president of U.S. operations at Simware, says his company's decision to use a proprietary protocol was made strictly out of technical necessity.

"We found that we had to make our own standards because we deal with ASCII characters," he says. IBM mainframes use EBCDIC, IBM's own standard character set. "There is no direction from IBM on what to do with micro-to-mainframe links.

"Microcom, Inc. published the Microcom Networking Protocol, which was really one of the first. Then came the Blast protocol [from Communications Research Group]," Sterling adds.

Renegades and establishment

Among these renegade protocols, the best known is Columbia University's Kermit. "It doesn't have a lot of business support because it comes from academia, but for occasional data transfer, Kermit is outstanding," Sterling says.

"We wrote our own protocols because we couldn't adapt something like Xmodem, and we needed something for linking to the IBM mainframe."

Xmodem was originally developed for asynchronous computers and so does not work well in IBM's synchronous half-duplex connections.

Spectrum Concepts, Inc. in New York hedged its bets even further. Its Xcom 6.2 software, an LU6.2-compatible file-transfer package, uses a serious standard. Xcom 6.2 currently supports IBM PCs, mainframes, System/34, 36 and 38 and DEC VAXs. Spectrum is likely to offer support for Wang Laboratories, Inc. and Data General Corp. products in the near future. Unlike LANs, the purpose of interconnecting these various machines is purely data transfer. Remote access and terminal emulation do not even enter the picture.

"We only address the bulk data-transfer market," says Joe Mohen an engineer at Spectrum. "Trying to address both the batch file-transfer and the terminal-emulation markets is a big mistake. Bulk transfer is 50% of the market and 10% of the complexity [of terminal emulation]."

> "TRYING to address both the batch file-transfer and the terminal-emulation markets is a big mistake. Bulk transfer is 50% of the market and 10% of the complexity."
>
> JOE MOHEN
> SPECTRUM CONCEPTS, INC.

Simware is also transforming itself into a file-transfer company. "The emulation business is becoming a hardware game," Sterling says. "Hardware protocol converters are cheap and reliable, and with IBM's entry into the market, we felt it was time to make a move."

These attitudes reflect important recent changes in the way mainframes are perceived strategically. Originally used as large host systems, mainframes lost their value as computers when minis and eventually PCs brought processing power closer to users. However, the PC did not replace the mainframe so much as the mainframe terminal. Other forces have been at work to keep mainframes around for a long time.

The changing mainframe

Now less useful as a processor, the mainframe is still the repository of years of corporate information buildup. Large data bases, as well as the applications that manipulate them, will remain tied to the mainframe for the near future.

Now that personal computers can handle multiple hard-disk storage devices with total capacities of up to 1G byte, some data bases can be moved. Certainly applications are more easily developed for PCs than for mainframes. But many large tasks will stay on the mainframe. It then

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needs to be accessed not as a host but as a resource.

When you say "resource," you are speaking the language of LANs, and many LAN vendors now offer micro-to-mainframe links. The LAN is to connectivity what the queen is to chess pieces; it is the most flexible tool for solving interoperability problems.

LAN gateway to the world

Developing a LAN gateway to a mainframe solves the problem of involving PCs in the unified-field theory of MIS. A representative and well-implemented line of gateway products is available from Dayton, Ohio-based Fox Research, Inc., maker of the 10-Net LAN. Fox's three-part offering consists of an SNA PC-to-mainframe link, an RS-232 serial or dial-up gateway and a software-only package that allows single PCs to dial into the RS-232 gateway without the need for a network interface card.

Fox's SNA gateway involves an IBM 3274 cluster-controller emulator card placed in a server machine and software, which must be installed on each PC requiring mainframe access. The system supports 32 logical units, allowing a maximum of 32 users to access the mainframe simultaneously. Each logical unit can support from one to four concurrent sessions with the mainframe.

The new generation of more capable mainframe gateways share a number of the following characteristics:

- They treat each link to the mainframe as a shared resource rather than as a dedicated connection. Unless an application requires users to be logged on to the mainframe at all times, the ability to reallocate logical units to a sort of free pool allows the gateway to support significantly more than 32 users in the real world.
- Most of these products cost about as much as the Fox gateway, which retails for $1,995. This price compares very favorably with that of an IBM 3270 terminal, which costs about $1,575, retail.
- Gateway products use an intelligent combination of hardware and software to provide a flexible solution. Once an SNA port is available on the network, a vendor can make other software available to exploit the port for other links, such as a PC-to-VAX link using LU6.2. An RS-232 LAN gateway allows distant network islands to be linked together by leased lines or dial-up connections. Such gateways require only software to handle the interface between the serial connection and the local-area network hardware.

The popularity of RS-232 gateways attests to the most important standard interface in the non-IBM world: the serial port. From Apple Computer, Inc.'s Apple II to the VAX 8600, asynchronous serial communications, while slow, is the cheapest, most popular way to move data between computers.

Asynchronous communications software, using serial connections, ties together everything from laptop computers to minicomputers to private branch data exchanges. The Unix operating system provides so many services oriented to serial connections that it almost seems to be a communications package with a built-in operating system.

RS-232 interfaces can also connect to the ever more popular packet-switched networks using the CCITT X.25 protocol. Packet assembly-disassembly (PAD) software, the key to transmitting data via X.25, is widely available for VAX computers. PC-based implementations cannot be far off. This will allow companies with disparate LANs to link them together using a combination of RS-232 gateways and nationwide X.25 PADs offered by value-added network vendors.

> WHEN you say "resource," you are speaking the language of LANs. The LAN is to connectivity what the queen is to chess pieces; it is the most flexible tool for solving interoperability problems.

Overseas mail

One of the most taxing applications to keep within the constraints of standards is E-mail software. There are several levels at which compatibility must be guaranteed. For instance, message text must be converted to the proper character set and addressing conventions vary from system to system. The problems are compounded by store-and-forward requirements, since different systems use different file-storage formats.

Retix in Santa Monica, Calif., has been making headway with these problems. The company recently demonstrated a prototype E-mail system bridging the gap between the Document Interchange Architecture standard associated with SNA and the CCITT X.400 electronic messaging specification promoted by the ISO.

Retix does not produce applications per se but provides OSI standard functions and subroutines that can be used by software developers and an MIS staff in building their own programs.

Unfortunately, even forward-thinking companies like Retix may not be prepared for developments overseas. In Europe, E-mail is associated with videotex systems, particularly the tremendously successful Minitel network installed by the French Postal Telephone and Telegraph. Many major players in the U.S., including IBM and AT&T, have invested heavily in

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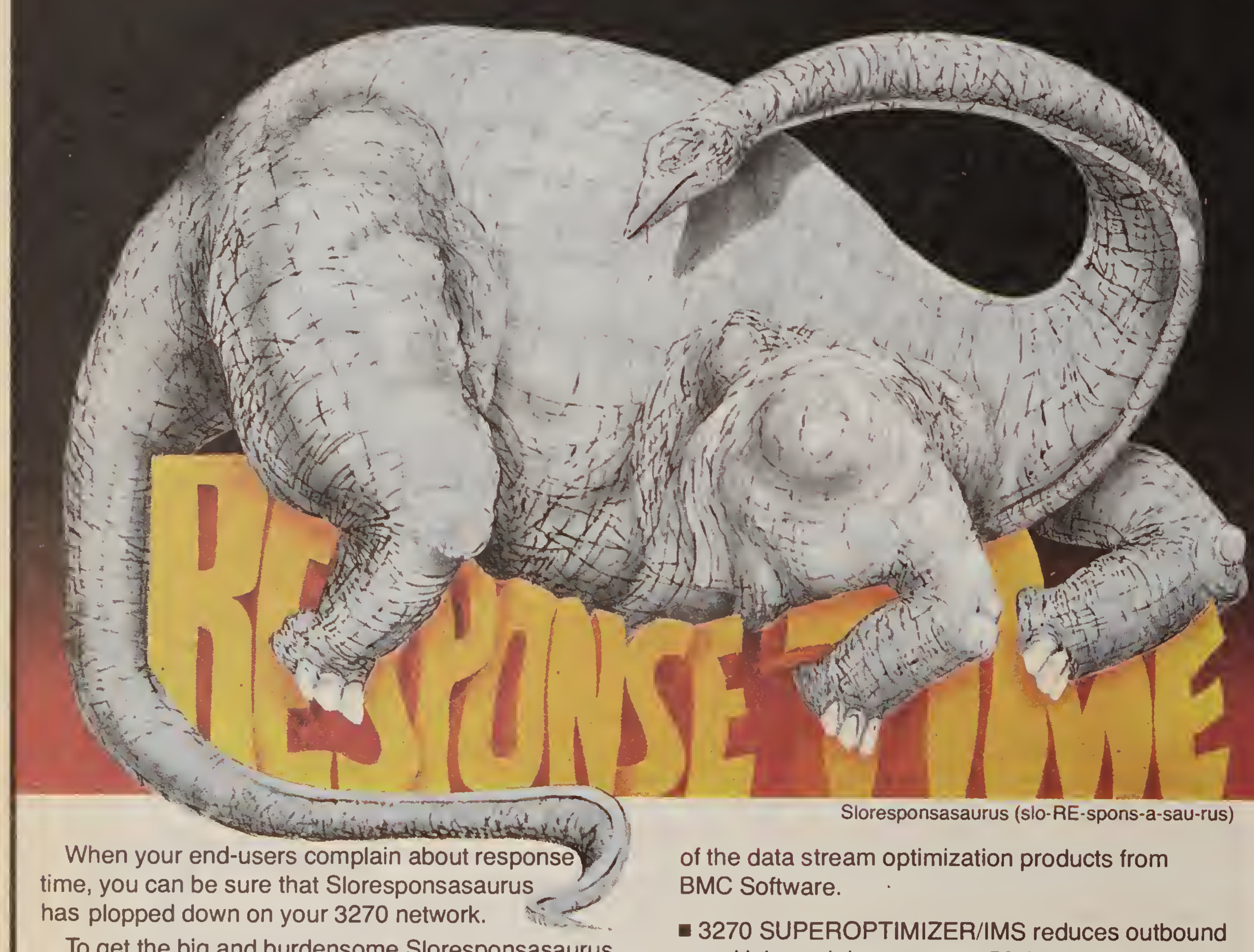

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videotex in the past — but to no avail.

Trials were announced with great hoopla, but most were considered failures. After years of skepticism, however, many vendors feel videotex may be making a comeback. In 1985, IBM joined forces with CBS, Inc. and Sears, Roebuck and Co. to form Trintex, a joint venture to produce a national system. CBS has dropped out of the project, but Trintex is still aiming for a 1988 announcement.

The approval of the North American Presentation Level Protocol Syntax, a text-and-graphics transmission and terminal behavior standard, has also encouraged many software vendors to enter the videotex game on an experimental basis. IBM's Videotex/370 Version 2 allows access to videotex systems using 3270 terminals.

AT&T offers the comprehensive Ariel 1500 system, which includes a videotex frame-creation system and networked terminals based on the AT&T 3B2 minicomputer.

Point-to-multipoint

An important — yet largely neglected — area of the communications software market is the subject of point-to-multipoint applications. A serious lack of standards in data acquisition as well as broadcast methods has left many users fending for themselves. Among those developing applications for PCs, the Greenleaf Software, Inc. communications subroutine library is very popular.

Users who need data acquisition and polling on the factory floor will find many applications based on the Manufacturing Automation Protocol (MAP) standard. However, the recently approved Version 3.0 of MAP lacks certain important interprocess communications features that make it less effective, slowing down its widespread acceptance.

Graphics will play an increasingly prominent role in future software development as computer graphics, particularly PC business graphics, grow in sophistication.

The arrival of the Integrated Services Digital Network, expected to go into operation in France in 1989 and to become available in the U.S. within five years, will provide the speed necessary to make regular graphics data communications feasible.

Ricoh Co., the West Caldwell, N.J.-based U.S. subsidiary of the Japanese facsimile manufacturer of the same name, will soon announce PC software that allows the package's users to compose text-and-graphics images by using existing word processors and paint programs and then send the composite documents across an X.25 network or dial-up lines using the CCITT-standard facsimile protocol. This software product represents one of the first attempts to apply the existing facsimile standards for image transmission to the realm of computer graphics.

As desktop publishing becomes more popular, more software will include the capability of merging text and graphics. Conventions for transmission of graphics will become a pressing problem in the near future.

Invisible resource

Where will all these wide-ranging developments lead? If the many new capabilities promised by developers of communications software are to be accepted, they must not require a massive reeducation of users or a complete rethinking of data communications strategies.

> THE MOVE AWAY FROM terminal-to-host concepts in software design will probably continue, making communications a feature of almost all applications rather than an application in its own right.

The move away from terminal-to-host concepts in software design will probably continue, making communications a feature of almost all applications rather than an application in its own right.

The transition from application to invisible resource requires communications programs to be easily customized and integrated into existing software environments.

Simware's Sterling says, "The watchword is API — applications programming interface. It is important for applications to have good APIs. Simware is scrambling to provide this. Most companies have developed in-house applications, and when you come in as a vendor, you're forcing the company to fit you in an environment where your product didn't exist before. People are not very cognizant of how communications work, but you still need procedures that are user-programmable."

The key word here is service. Users rightly perceive software not as a product but as a service. The evolution of videotex and on-line information services serve only to encourage this perception.

Why should the user have to distinguish between information on the LAN and the dial-up newswire? Ultimately, the arbitrary technical distinctions in the data stream serve to distract users. Transmitted data is a single information resource, and its classification and absorption take place not in the network — but in our minds. ●

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COMPUTERWORLD
IBM revs up 3090s — with a hitch
Rolls out biggest mainframe ever
INSIDE
BY STANLEY GIBSON

INTERVIEW

READYING A DIGITAL THRUST

The nature of data communications — what can be attempted and achieved between two computers — is changing, in large part because of changes in the public telephone network. In the next 10 years, U.S. telephone companies will be rebuilding the phone network top to bottom, at an estimated cost of more than $100 billion.

Bailey Geeslin, vice-president of network planning at Nynex Corp., spoke recently with Bruce Page, president of Magnetic Press, Inc., about Nynex's plans to become a diversified information carrier.

How much data is moving through the Nynex network, as compared with voice traffic?
We have no solid way of knowing the answer to that without listening to the lines, which we cannot do. Ten percent is the highest estimate we've made.

There are probably 250,000 modems connected to the Nynex network today; that number is doubling every two years. Still, out of our 10 million lines in service, that's not a very high percentage. My guess is that data takes up 5% or less on the public switched telephone network.

With leased lines, the figure is a bit higher. Overall, probably 10% of the traffic on conditioned lines is used for data. At the upper end of the market, our large customers use 15% of their leased-line capacity for digital data traffic.

What percent of your switching offices is digital?
Seventeen percent of the end offices today are digital; 50% will be in 1990. That number is deceivingly low, however, in terms of the impact digital is having on our network. For instance, anyone in New York or Boston who wants digital service can get it, whether or not he is served by a digital end office.

What are Nynex's plans for offering switched digital services?
In terms of digital services, Nynex currently has several. Digipath is our trade name for digital data service, and it comes in several speeds up to 56K bit/sec. Other digital nonswitched services include Nysernet, the New York State Educational Resource Network, which is a 1.5M bit/sec. network that ties together university computer centers throughout New York State.

We also offer switched 56K bit/sec. service and the Centrex-based Central Office local-area network [CO LAN] service, which supports data rates of up to 19.2K bit/sec. The CO LAN is used mostly for extending the reach of our customers' on-premises LANs.

Finally, we're introducing Infopath, our packet switching service, in New York and soon in Boston. Our customers will have access to packet facilities either by leased access or by modem — synchronous or asynchronous. We'll also offer dial-up access eventually for small business or residential access to the kinds of information resources only big companies currently use.

As more people begin to use data, traffic patterns on your network will change. What impact will more data have on your plans for building your network?
Nobody can predict what the future of data communications is going to be like. But we're doing two things at a fundamental level that will help us handle more data. The first is that we're putting in digital facilities whenever we replace equipment. Digital is more efficient and cheaper to operate, so eventually we'll have an all-digital network.

The second thing we're doing is pursuing the Integrated Services Digital Network [ISDN] concept through research and development projects. For example, we're testing an ISDN internally here at Nynex and will offer commercial ISDN service in the next couple of years. In fact, a lot of our services today are early ISDN services that will fall away as ISDN comes on-line.

What are your plans for packet switching?
Packet switching is a good solution for switching large amounts of "bursty" data — noncontinuous streams of data with relatively long periods of silence on the line. In traditional dial-up circuit-switched networks, the long holding times of data calls can make the network bog down. Packet switching handles these types of calls quite nicely.

With the increasing amount of fiber-optic cable in our network, we'll be less sensitive to traffic loads than ever before. We're finding fiber has almost limitless capacity, so once we've got the fiber in the ground, we can increase our capacity very easily. For example, Nynex is currently experimenting with sending up to a terabit per second over one fiber. One such fiber could carry all the telecom traffic in the U.S.

With all that capacity, the biggest question is where to apply it. That's why the big focus at Nynex now is on marketing.

What is Nynex doing to promote use of its network?
Right now we're focusing our R&D in several key areas in software, including artificial intelligence, expert systems and voice recognition. By doing fundamental research in these areas we mean to develop leading-edge information applications for the mass market. If the market for using digital data transmission is only the people who already use information systems, we'll have a very large amount of capacity on our hands and a very small market for it.

On the other hand, if we can make it easier for the common person to use computers and data communications, then we can expand the market for our services. For example, more people might use computers if they could talk to them. So we're working on voice-recognition systems. For instance, a computer-shy executive manager might make data base inquiries by simply asking for the figures.

Another use for our bandwidth might come from high-definition TV [HDTV]. The difference in picture quality is so great that we feel it will be a real driver for broadband telecommunications service. HDTV has 1,125 scan lines per raster vs. the 525 TV has today. The signal for HDTV is too broad to be broadcast over the airwaves. It probably takes a 150M bit/sec. channel to carry it. One day we may deliver television channels by fiber-optic cables to the home.

What other applications do you envision from the advanced network?
A certain amount of that is out of our hands. The Federal Communications Commission requires us to have an open network architecture that makes it easy for other companies to build their applications on. So we anticipate a number of novel services to be introduced by other companies.

Bailey Geeslin ALAN WITSCHONKE

Nynex is also working with Citibank NA and RCA Corp. on an interactive home-shopping service that may build on the success of some of the home-shopping services offered on cable [television]. We're looking at freeze-frame video technology as one way to deliver shopping services more economically.

How do you prepare for the future when the applications are so uncertain?
You do it with an insecure feeling. Fortunately, we don't have to deploy equipment now for use in 1995. It isn't like building a major public works project where we have to break ground 10 years in advance. We still have time to experiment.

Still, we are doing the research into future applications of the network. Over the next couple of years, we'll probably push more optical fiber into the end loops that serve our customers. That fiber will give us the capability to offer broadband services for users and service vendors to experiment with. ●

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Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2

One man's exploits in PC data transfer

BY BERT GREEN

Communicating with a microcomputer should be as easy as using the telephone. After all, you use ordinary telephone lines for computer communications as well as familiar accessories like jacks and plugs. Unfortunately, though, the similarity stops there.

My background is in telephone communications, which only sketchily prepared me for dealing with the element that really makes the critical difference in computer communications — communications software. In previous employment, I rejected any contact with computers or terminals. Then I started a voice-communications consulting business. The secretarial service I used was reaping a windfall from me, so two-and-a-half years ago, I bought an AT&T 6300 Personal Computer.

I am now completely fascinated by microcomputers, but I am still learning about communicating with them. Learning to communicate with a computer can be a frustrating experience although, finally, a rewarding one.

Communications software has saved me time and money in sending and receiving telex and teletype messages and has greatly enhanced my ability to react swiftly to client needs for reports and documents.

The rewards continue as you successfully send and receive messages, transfer data information or connect to Readers Digest Association, Inc.'s The Source, Compuserv and other mainframe data bases. The software program you select is the key to how quickly and easily you actually get on-line.

In the public domain

Communications software comes from multiple sources. Some are public domain, such as shareware, which is freely distributed on bulletin boards but for which you pay support and documentation fees, and others come from software specialty companies. Prices range from $2 for packages in the public domain to several hundred dollars for other packages.

One of the better programs I have encountered is Procomm, a shareware product. Some patience is needed to learn to use Procomm, but it is capable of performing nearly any asynchronous communications task. This includes uploading, downloading, terminal emulation and the remotely controlling another PC across telephone circuits.

Different purposes

There are five communications programs loaded into my computer: PC Talk III and Procomm 2.4.1, Bitcom from Bitcom Communications and AT&T's Softcall and Mail Access I for electronic mail. Each serves a different purpose.

The Procomm and PC Talk III shareware programs were given to me, and I am not yet fully comfortable with them. I always use Bitcom when I call a bulletin board because it will grab everything that I send or receive with no effort.

Softcall's menus and function keys do nearly everything for you, including logging on and off. Although it lacks the complete functionality of Procomm, Softcall is a capable fast and easy-to-use program.

E-mail is available as a function of Compuserv, Source, Mail Access I or other common carriers. You can use a standard software package or buy those companies' specific software package. These are special programs that encourage you to use the service. I subscribe to all three services, but I get the most use from Mail Access I.

With Mail Access I, all you have to do is bring the program on-screen and then use function keys to send, receive, review, read or prepare to write a message. The Message Editor is an easy-to-use word processor and will handle up to 150 lines for each message.

Compuserve, Source, AT&T and other common carriers offering services that involve communications with a remote mainframe design their access schemes for ease of use. Digital Equipment Corp., Hewlett-Packard Co., Tandem Computers, Inc., AT&T and Unisys Corp., all of which have mainframes that operate in an asynchronous environment, are also easily accessible. The synchronous environment of IBM and Wang Laboratories, Inc. is another matter, however.

If you need to communicate with mainframes in the synchronous world, you face a more complicated process that involves two stages of software. This is an area in which you may benefit from the expertise of a value-added reseller. In general the best experts are other users and the best teacher is practice with actual calls.

Green is president of Green Consultants of Vero Beach, Inc., which provides voice and data communications consulting services.

The merging of DP and telecom is vital

Interconnect firms help to mediate

Data processing and telecommunications are like tides on either side of an ocean. Although the two technologies have merged considerably from a manufacturing point of view, they continue to be separate in the ways they manifest themselves to users.

Until local-area networks (LAN) appeared, companies almost always had completely different sources for their data processing and communications needs. AT&T bravely tried to buck this trend by introducing its own line of personal computers, but even its mighty voice could not carry in the din of competition. The connectivity deadlock will not be overcome, however, until the merging of processing and communications is understood as more than a marriage of convenience.

A step in the direction of solemnizing this union has been taken by some communications product vendors. These vendors, dismayed by the lack of communications and connectivity literacy exhibited by many PC dealers, have begun looking to telecommunications interconnect companies as an alternate distribution channel.

The interconnect method

That is the route chosen by Newbridge Communications Network Corp., an Ottawa-based manufacturer of small data communications switches. Company President Terry Matthews says Newbridge chose telephone interconnects — value-added resellers of telephone systems — as its distribution route for two reasons: "They sell to small users and departmental users and frequently go knocking on doors."

Newbridge's distribution strategy points up the way development has seesawed between computing and telecommunications since the invention of the telephone.

As Peter Huber says in "The Geodesic Network," his massive report on the U.S. telecommunications industry, "When switching is expensive and transmission is cheap, the efficient network looks like a pyramid. The system has comparatively few switches; it has many lines. By contrast, when switching is cheap and transmission expensive, the efficient network is a ring." Huber adds in a footnote, "This partly explains why AT&T is Pharaoh of the pyramid network while IBM is Lord of the Ring."

Currently, the data processing installations in most corporations resemble haystacks, in which connectivity is the needle. And that needle is going to remain elusive if MIS managers as well as vendors continue to pursue it in the same old places. Neither pyramid nor ring architectures can solve the conundrum of PC networking. Clearly, vendors must shift their approach from a technology-driven one to a solution strategy.

Limited imagination

Today, switching costs and transmission costs are roughly equivalent, which means the choices should be wide open in terms of connectivity options. That they are not, as yet, is more a function of limitations in imagination than in information handling. Vendors will not experiment because they are wedded to the safety of historical precedent and proven engineering.

> "I'D HATE TO BE a buyer right now facing the incredible plethora of standards. Even the acronyms are getting difficult to understand."
>
> ROBERT MILLSTEIN
> VM PERSONAL COMPUTING, INC.

There is a lesson to be learned from the evolution of the telephone interconnect industry. The market for traditional office communications systems — key systems and private branch exchanges — has reached the top of its curve, as the PC market will shortly.

In the current phone system market, the major trend is basically to surround the phone systems, which have become commodity items, with gadgetry, most of which is PC-based.

PCs, which are also on the way to becoming commodities, are beginning to travel the same road. At first, the direction for add-ons was clear: to fill the expansion slots, offer more memory and greater display resolution and provide special features like voice recognition or additional ports.

The common weakness of all these first-generation enhancements is that while they all increase existing functionality, they add nothing to the PC's fundamental capabilities. LANs, gateways and micro-to-mainframe connections, on the other hand, truly change what users can do with their machines.

It is no longer enough, however, to look for solutions inherent in the technology. Strategies for connectivity must stem directly from the problems they are supposed to solve. Right now, the two dominant problems are compatibility and standards.

"Multivendor interoperability" is a term that slides off the tongue more easily than it is understood. When people consider compatibility, they are inclined to think about it as strictly a hardware problem; in fact, it is much more complicated than that.

Gabe d'Anunzio, vice-president of marketing at Micom Systems, Inc., says, "The operating systems of all the computers that might be connected are unable to understand one another. Existing applications don't know anything about the concept of distributed information. Even if MIS standardizes on something like Unix, it would help, but it wouldn't solve the problem."

In order to successfully connect all computers, MIS managers require a thoroughly new data processing environment. Patching the old cloth won't suffice. But this takes longer in computing than in any other evolutionary environment.

Finally, there is the issue of standards to contend with. Since IBM's seal of approval is no longer a guarantee of universal acceptance, a dangerous gridlock is developing in the promotion of standards.

"I'd hate to be a buyer right now facing the incredible plethora of standards," says Robert Millstein, president of VM Personal Computing, Inc., a Danbury, Conn., communications software development firm. "Even the acronyms are getting difficult to understand."

Vendors have responded to some market needs in recent years, and LANs have become more useful. In the process, the oldest connectivity problems of personal computing — simply connecting the printer to the right port, configuring the software and so on — have been, if not solved, at least tremendously simplified. It is for the sake of more of this kind of efficiency that MIS must actively promote connectivity in the office.

Two major connectivity challenges remain. We must learn to connect incompatible systems and develop formal methods to ensure standardization of software development. Only when these goals are achieved will we reap the connectivity's benefits.

DANIEL GROSS

AIDS research project buys critical time savings with communications package

BY BECKY BATCHA

Because of the special urgency that accompanies their work, the coordinators of a national Acquired Immune Deficiency Syndrome (AIDS) research project are especially grateful that packaged communications software exists. A commercial communications package saved them precious time during the start-up of a five-year, $100 million project to gauge the effectiveness of a variety of drugs in combating the AIDS virus.

The Research Triangle Institute (RTI), a nonprofit contract research organization in Research Park Triangle, N.C., was granted a government contract in October 1986 by the National Institute of Allergy and Infectious Disease to coordinate the data collection and analysis efforts of 19 AIDS treatment centers that would be conducting clinical trials for the project. Participating centers included facilities at Johns Hopkins University, Stanford University, Harvard University and the Memorial Sloan-Kettering Cancer Research Institute and other prestigious institutions nationwide.

The RTI crew had no time to lose in setting up its data gathering network, since the clinics would begin enrolling patients in February, just four months down the road.

"Usually, there is anywhere from six months to a year of preparation before a clinical trial actually goes to the field," says Dick Paddock, RTI's data communications specialist on the AIDS research project. "But we hit the ground running, and it was really difficult."

Programmers had to pull together a sophisticated set of data entry programs that would allow the 19 clinics to key pertinent data from clinical forms into on-site IBM Personal Computer ATs. They also needed to develop routines that would channel the collected raw data into clinical records on the project's host computer, a Digital Equipment Corp. VAX 8650 at RTI headquarters. In addition, they had to find a way for the VAX to poll the PCs remotely over standard dial-up telephone lines.

Development and customization of the data collection and processing components consumed more than 3,000 man-hours of work, according to Paddock. However, the packaged communications software RTI purchased to handle data transmissions, the Blast program from Communications Research Group, required only minor modifications before it was ready to roll. "I'm certainly glad something like Blast was available to handle that part of the problem so we could concentrate on other things," he says.

> THE AIDS research project is RTI's first attempt at distributed data entry via phone lines. The standard method has been to gather paper clinical forms by mail and have the information keypunched.

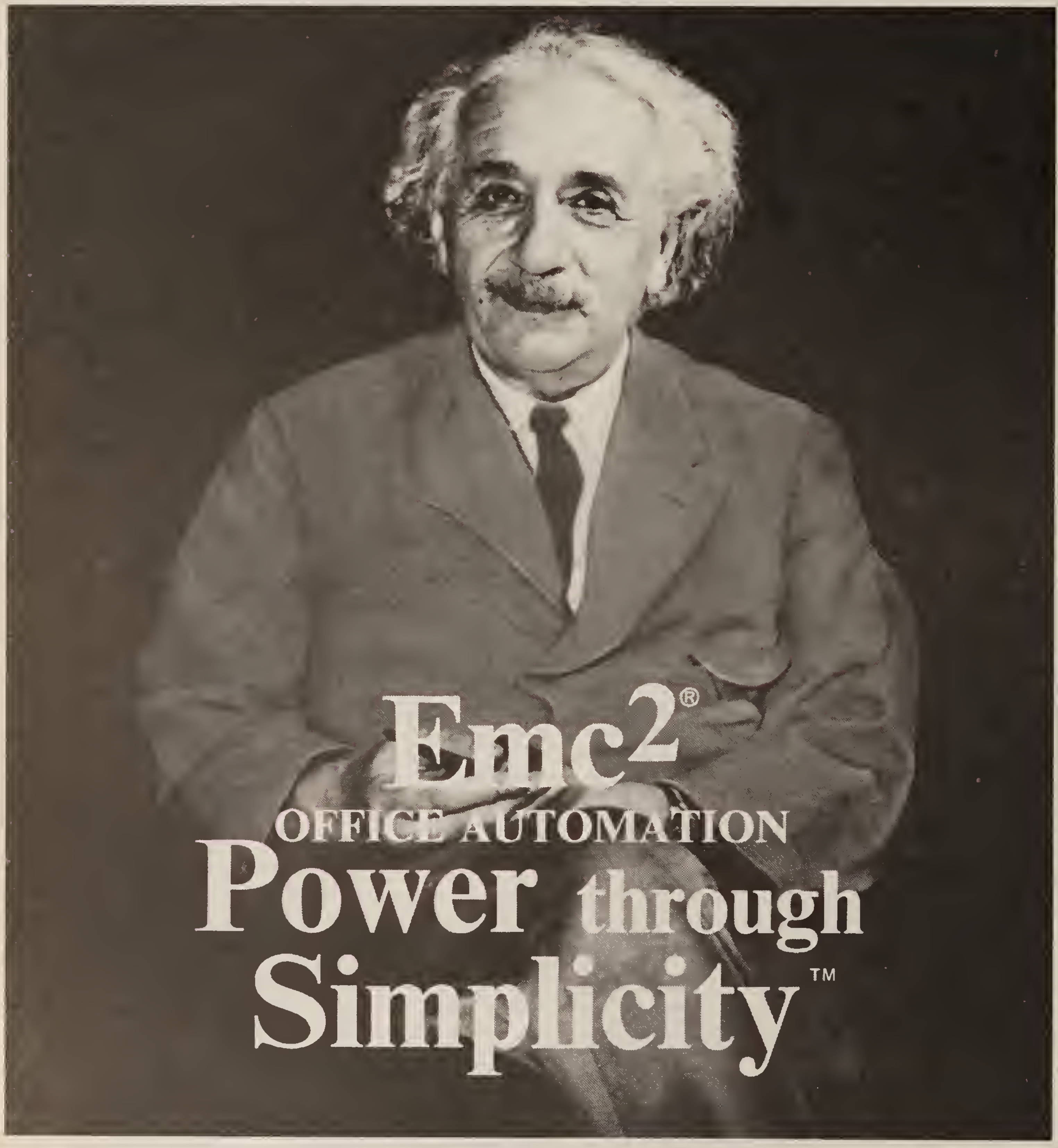
Paddock spent only about 150 hours coding the Blast software to work as required. Most of his modifications, on both the personal computer end as well as the host end, consisted of writing scripts that either allowed the clinics' PC ATs to accept commands from the VAX at RTI headquarters or allowed the VAX to issue commands to the PCs. Paddock says his only other enhancements to Blast were accessory routines for the PCs, such as one that performs automatic backups.

The finished data collection arrangement for RTI's AIDS research project is a model of efficiency in data entry and transmission. It works as follows:

Everyday, employees at each of the clinics enter patient information into an AT. The proprietary RTI Data Entry Package presents an exact on-screen duplicate of the paper forms that clinicians fill out for their patients, making it easy for data entry clerks to transfer the information. "It displays the forms electronically on the screen, and they just fill in the blanks," Paddock says.

The data entry screens reflect the project's focus on drug treatment trials. Along with standard screens that mimic physical examination forms and follow-up exam forms, the software includes forms that record the administration of specific

Batcha is a free-lance writer based in Boston.



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drugs, forms that report adverse or unusual reactions and so on.

As the data is entered, it is stored on disk for retrieval by the VAX at RTI headquarters. Every night, when they sign off of their PC ATs, the clerks initiate a set of batch transactions to prepare the machines for remote polling by the host. They need only type "goodnight" to start the processing. "We had to make it easy for them to remember," Paddock says.

The Blast package comes into play at this point. A copy of Blast runs on each of the clinical PCs and on the VAX 8650 at RTI, giving the machines a common protocol with which to communicate.

This ability is nothing unusual, Paddock points out, and can be attained with any number of software packages, two of them (Kermit and Xmodem) available free in the public domain. What attracted RTI to the Blast package in particular was its ability to operate in unattended batch mode on the VAX.

RTI wanted its host machine to poll the clinics' PCs late at night to take advantage of low phone rates. Blast was the only package RTI found that would work on its own, Paddock says.

Every night after midnight, the VAX at RTI dials the PC ATs and sends commands that call for the transfer of data from the remote locations. At the same time, the VAX sends any critical electronic mail messages or project documents that need to be forwarded to the remote sites and downloads any software updates.

Security measures

Its work completed, the VAX signs off, leaving a display on the PC screen that alerts clinicians to awaiting messages. A security measure that Paddock programmed into the Blast software then instructs the PC's modem not to answer the phone again that night.

Blast provides additional security through a two-way password scheme. The software requires the presentation of a password before any system can either send or receive clinical information.

Once the data arrives at the VAX, RTI's proprietary data management software, the Fully Integrated Control System (FICS), cleans up incoming data. The software also calls attention to critical incoming data and notifies the originating clinic of any missing information.

Data from the clinical trials then enters a master data base, where it is filed into separate queues for each of the 19 clinics. At this stage, any clinic can go through Blast to access information in the data base about its own AIDS treatment trials.

As clinical information passes into the master data base, RTI's FICS flags any instance in which a patient develops a bad reaction to a drug or shows any unexpected reaction, good or bad. Researchers are then immediately alerted to watch for similar reactions.

Paddock says the ability to generate an immediate alert is one of the biggest benefits of using an electronic data collection scheme. "The typical clinical trial is run on paper. You don't see results for a couple of months, and that's too long."

Paddock stresses the urgency attached to AIDS research. "There are lots of people out there dying," he says.

As a nonprofit contract research organization, RTI is currently conducting several hundred studies for the federal government, state and local governments and commercial clients. Its work includes studies on everything from the effectiveness of public education throughout the country to the use of diamonds as a substrate in semiconductor chips. The institute employs about 1,100 people, 900 of whom are researchers and scientists.

The AIDS research project is RTI's first attempt at distributed data entry via phone lines. The institute's standard method has been to gather paper clinical forms by mail and have the information keypunched at a central location.

However, the electronic data gathering and transmission have worked so well in the AIDS research project that, according to W. Kenneth Poole, vice-president in charge of statistical methodology and analysis, these methods will be used in future clinical trials of all sorts. •

"USUALLY, there is anywhere from six months to a year of preparation before a clinical trial actually goes to the field. But we hit the ground running, and it was really difficult."

DICK PADDOCK
RESEARCH TRIANGLE INSTITUTE

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Asynchronous PC communications software

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
AT&T (800) 828-UNIX	Remote File Sharing	Unix System V Release 3	Intel 80386- and Motorola 68020-based workstations	1M	Transparent sharing of files, printers, communications links, program-to-program communications	Ethernet, X.25	OSI transparent service	Yes	NA	Contact vendor
Advanced Technology Center (213) 568-9119	Twinterm-05	MS-DOS, PC-DOS	IBM PC and compatibles	256K	Graphics support for CGA, EGA, text support, macro support, screen dumps, terminal reporting, Tektronix 4105 terminal support, mouse support	Kermit	—	Yes	Yes	$345
Bizcomp Corp. (408) 733-7800	Intellisoft	MS-DOS	IBM PC and compatibles	60K	Automatic logon, menu-driven	Xmodem	Xmodem	Yes	NA	$69
	Intellisoft Plus	MS-DOS	IBM PC and compatibles, VT100 emulation	60K	Automatic logon, menu-driven	Xmodem	Xmodem	Yes	NA	$99
Cambridge Computer Corp. (203) 288-6004	PC 73/78	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Emulates Honeywell VIP 7200, 7300, 7800 asynchronous terminals, provides support for eight asynchronous adapters on PS/2, script processing, print redirection, attended and unattended modes of operation	Kermit, Xmodem, Honeywell Kermit	Kermit, Xmodem	No	No	$295
Chi Corp. (216) 831-2622	Chi DEC VT100 Emulator	MS-DOS	IBM PC, XT, AT and compatibles	256K	Full VT100 emulation, on-line Help functions, compatible with other Chi emulator products	Kermit, Xmodem, VT100 native emulation	Kermit, Xmodem	No	No	$535
Coefficient Systems Corp. (212) 777-6707	Vterm Version III	Unix, VMS, RSX, RSTS	IBM PC and compatibles	256K	Terminal emulation of VT52, VT100, VT101, VT102, scroll-back buffer, save and recall, up to 80 scrolled-off screens	Kermit, ASCII, Xmodem, proprietary	CRC[1], Checksum	No	Yes	$195
	Vterm/220	Unix, VMS, RSX, RSTS	IBM PC and compatibles	320K	User-mappable keyboard, bundle with data-conversion program, a superset of Vterm III to include VT220 emulation	ASCII, Xmodem, Kermit, proprietary	CRC, Checksum	No	Yes	$245
	Vterm Version 4010	Unix, VMS, RSX, RSTS	IBM PC and compatibles	256K	Tektronix 4010 emulation, VT100 series mode for file transfer, supports a host of different plotters	ASCII, Xmodem, Kermit, proprietary	CRC, Checksum	No	Yes	$249
Communications Research Group (800) 24-BLAST	Blast	MS-DOS, Unix, Xenix, VMS, Primos, VS, CMS, MV, TSO, MPE, RTE	Micros, minis, mainframes with RS-232 ports	128K	Error-free peer-to-peer file transfer across different operating systems, script language to automate repetitive functions, automatically invokes transactions on unattended systems	Proprietary, Xmodem	Proprietary, Xmodem	Yes	Yes	$250-$5,500 (depending on hardware)
Computer Vectors, Inc. (800) 262-RCOM	R Com2/PC	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file-transfer protocols, automatic script processing and dialing, resident option	Xmodem, ASTP	Any	Yes	—	$69.95
Concept Omega Corp. (Thoroughbred Software division) (800) 524-0430	Thoroughbred Link	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Terminal emulation, file transfer, autodialing into host system	—	NA	No	No	$695
Conntect Computer Co. (612) 944-0181	Connect	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Terminal emulation (VT100, IBM 3161), file transfer, automatic script processing and dialing, fully customizable, menu- or command-driven	Kermit, Xmodem	NA	Yes	No	$99
Convergent Technologies, Inc. (800) 237-4565	PC Exchange	MS-DOS, Unix	IBM PC, XT, AT and compatibles, Unix System V Release 3 and compatibles	256K (PC), 2M (Unix)	Transparent access to network resources, large networks with many servers, ability to use multiple media	Proprietary	Proprietary	Yes	Yes	Contact vendor
Crosstalk Communications (a division of Digital Communications Associates, Inc.) (404) 998-3998	Crosstalk XVI	MS-DOS	IBM PC, XT, AT and compatibles	128K	Electronic mail, file transfer, terminal emulation, macro capability, capture-to-disk capabilities	Proprietary, Xmodem	Proprietary, Xmodem, Kermit	Yes	Yes	$195
	Crosstalk XVI (network version)	MS-DOS	IBM PC, XT, AT and compatibles	128K	Works with IBM Token-Ring, requires IBM asynchronous communications server, file transfer, terminal emulation	Proprietary, Xmodem	Proprietary, Xmodem, Kermit	Yes	Yes	$600
	Crosstalk Mk.4	MS-DOS	IBM PC, XT, AT and compatibles	256K	File transfer, terminal emulation, multiple sessions, macro capability, capture-to-disk capabilities	Proprietary, Xmodem, Ymodem	Proprietary, Kermit, Xmodem, X.PC, Compuserv B	Yes	Yes	$245

[1] Cyclical redundancy check

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
Crosstalk Communications (404) 998-3998	Remote	MS-DOS	IBM PC, XT, AT and compatibles	128K	Electronic mail, remote operation of another PC, file transfer, remote software troubleshooting	Proprietary, Xmodem	Proprietary, Xmodem	Yes	No	$195
Datran Corp. (800) 332-0456	Turbocom	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	—	Single-command-line file transfer, easy to use, increases bit/sec. rate of modems by four times	Proprietary	—	No	—	$95
Direct Aid, Inc. (800) 443-8080	Impersonator	MS-DOS	IBM PC, XT, AT and compatibles	256K	Emulates more than 15 different terminals, own programming language built in, extended applications program language, advanced keyboard macros	Proprietary, Xmodem	Proprietary, Xmodem	Yes	No	$245
Diversified Computer System, Inc. (303) 447-9251	EM220	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	128K	Modem dialer, Xmodem and Kermit file-transfer protocols, DOS hot key, hard-copy support, on-line Help	Xmodem, Kermit, ASCII	Xmodem, Kermit	—	Yes	$169
	EM4010	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Modem dialer, Xmodem and Kermit file-transfer protocols, DOS hot key, hard-copy support, on-line Help	Xmodem, Kermit, ASCII	Xmodem, Kermit	—	Yes	$249
	EM4105	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	350K	Modem dialer, Xmodem and Kermit file-transfer protocols, DOS hot key, hard-copy support, on-line Help	Xmodem, Kermit, ASCII	Xmodem, Kermit	—	Yes	$349
Dynacomp, Inc. (716) 671-6160	Easy Access	MS-DOS	IBM PC, XT, AT and compatibles	128K	Uses Xmodem protocol, can write to all drives and subdirectories, various levels of security, sends and receives data files of any type	Any communications supported by Hayes modem	Xmodem	No	No	$29.95
	Texcom Communication	CP/M	Kaypro 2, 4, 10, Osborne Executive, Osborne 1, Morrow MD2, Morrow MD3	64K	Uses Xmodem protocol, can write to all drives and subdirectories, various levels of security, sends and receives data files of any type	Xmodem	Xmodem	No	No	$49.95
Dynamic Microprocessor Associates (212) 687-7115	Ascom IV	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	File transfer, terminal emulation, script language, bulletin board/electronic mail, dial directory	Xmodem, Xmodem CRC, Kermit, CRLF, X-on/X-off, proprietary	Yes	Yes	—	$195
Eastman Communications Co. (an Eastman Kodak Co. company) (716) 464-5500	PC Syncra Software	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	File transfer with wide-area network including other PCs, micros, mainframes (each having a separate copy of Syncra software installed)	Proprietary	Proprietary, CRC	No	NA	$495
Five Paces Software, Inc. (404) 873-1096	Unilink	Unix, Xenix	IBM PC AT and compatibles	—	Xmodem file transfer, virtual terminal emulation of a variety of ASCII terminals with logging function	Xmodem	Xmodem	No	—	$200
GCE (718) 359-1621	Remcom	MS-DOS, CP/M	IBM PC and compatibles	256K	File transfer, terminal emulation	Proprietary	Proprietary with CRC-16	No	No	$100
Generic Computer Products, Inc. (906) 249-9801	F-Trans	CP/M-80, MS-DOS, PC-DOS	Any machine with an RS-232 serial port	64K, 128K	File transfer, multiple files per command using wild cards, 50 to 38.4K bit/sec.	Proprietary	Proprietary	No	No	$59.95
Genesis Microsystems Corp. (415) 964-9001	Access-II	MS-DOS, PC-DOS, ISIS-II	IBM PC, XT, AT and compatibles, Deskpro 386, Intel microcomputer Series II, III, IV	64K	File transfer between PCs and Intel development systems, support of development system software on PCs, board to run 8-bit software on PC	Proprietary	Proprietary	No	No	$1,195
	Access-86	MS-DOS, PC-DOS, ISIS-II	IBM PC, XT, AT and compatibles, Deskpro 386, Intel microcomputer Series II, III, IV	64K	File transfer between PCs and Intel development systems, support of development system software on PCs, software support for running 16-bit development software on the PC	Proprietary	Proprietary	No	No	$495
Gould, Inc. (617) 475-4700	Modbus II	MS-DOS	IBM PC, XT, AT and compatibles	640K	Peer-to-peer communications, high-speed data transfer, file transfer	Token-passing network	Yes	Yes	No	$1,000-$4,000
Grafpoint Co. (408) 249-7951	TGraf 05	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Tektronix 4105 emulator	Asynchronous, Xmodem, Kermit	NA	Yes	No	$495
	TGraf 07	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Tektronix 4107 emulator	Asynchronous, Xmodem, Kermit	NA	Yes	No	$995
	TGraf 15	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Tektronix 4115 emulator	Asynchronous, Xmodem, Kermit	NA	Yes	No	$1,995
Greenleaf Software, Inc. (800) 523-9830	Greenleaf Comm Library	MS-DOS, PC-DOS	IBM PC and compatibles	256K	Hayes modem functions, control break exit	X-on/X-off, Xmodem	Xmodem	Yes	Yes	$185
Hawkeye Grafix, Inc. (813) 855-5846	Commx	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	64K	Hot key switches between terminal and word processor instantly, supports dial directory, electronic mail	Xmodem, Kermit, proprietary, X-on/X-off	Xmodem, Kermit, proprietary, X-on/X-off	Yes	Yes	$99

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
H & A Computer Products, Inc. (800) 654-3215	PCX 3101	EDX	IBM PC, XT, AT and compatibles, Series/1	84K	IBM 3101 emulator, hot key, background processing, works with any asynchronous device	Asynchronous	Asynchronous	Yes	—	$195
Hayes Microcomputer Products, Inc. (404) 441-1617	Smartcom I	Apple DOS, Pascal CP/M, Pro DOS	Macintosh II series	64K to 128K (depending on hardware)	File transfer, Xmodem protocol, prints as you download or store to disk	Stop/Start, Hayes protocol, Xmodem	Xmodem, Hayes protocol	Yes	Yes	$119
	Smartcom II (for the Macintosh)	Macintosh operating system, PC-DOS	Macintosh, Mac Plus, Mac SE, Mac 512	128K, 512K (for interactive graphics)	File transfer, Xmodem protocol, prints as you download or store to disk	Sendline, X-on/X-off, Await Character Echo	Hayes, Xmodem Mac Binary, Xmodem Mac Terminal	Yes	—	$149
	Smartcom II (for the IBM PC)	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	192K	File transfer, automatic logon to data bases, terminal emulation, unattended operation	Sendline, Start/Stop	Hayes protocol, Xmodem, Xmodem-CRC	Yes	—	$149
	Smartcom III	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	512K (hard disk)	On-line editor, scripting language, multiple sessions	Sendline, Start/Stop	Xmodem, Xmodem-CRC, Kermit, Xmodem-1K, Ymodem, Ymodem-G	Yes	—	$249
Hewlett Packard Call local HP office	HP Advancelink	MS-DOS	IBM PC and compatibles, HP Vectra, HP Touchscreen	320K	Access to HP Personal Productivity, shared information, shared printing, central backup	Xmodem	—	No	Yes	$295
	HP Serial Network	MS-DOS	IBM PC and compatibles, HP Vectra, HP Touchscreen	—	Remote, transparent access to shared disks and peripherals for MS-Net and HP Personal Productivity Center	HP TCP/IP	HP TCP/IP, CRC-16	No	Yes	$300
Ideassociates, Inc. (800) 257-5027	Ideacom 5251/Share	SSP, CPF	IBM System/36, 38	128K	Allows up to four PCs to emulate IBM 5250-type terminals and printers, supports local and remote asynchronous communications	Twin-axial (5250 communication)	NA	Yes	No	$495
	Ideacom 5251/Gateway	SSP, CPF	IBM System/36, 38	128K	Allows PC to attach to LAN and communicate with System/36, 38	Twin-axial (5250 communications)	NA	Yes	No	$1,495
Information Technologies, Inc. (800) 431-3460	Aterm/ Ablock	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	—	Peer-to-peer communications, VT100 emulation	Proprietary	CRC	No	No	$45
	VT52/100	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	—	Xmodem, Kermit, VT100 emulation, printer support	Xmodem, Kermit	—	No	No	$195
Inner Loop Software (213) 822-2800	VDTE	PC-DOS	IBM PC, XT, AT and compatibles	256K	Emulates HP terminals	HP Blockmode (HP proprietary protocol)	NA	No	No	$200
	DLX	PC-DOS	IBM PC, XT, AT and compatibles	512K	Multiline bulletin board system	Xmodem, ASCII	Xmodem	No	No	$200
Interactive Systems Corp. (213) 453-8649	Interm	MS-DOS, Unix	IBM PC, XT, AT and compatibles	64K	Emulates several different terminals, file transfer between Unix and PC-, MS-DOS, allows Unix system to control PC-, MS-DOS system	Xmodem	Xmodem	No	No	$300
Intercomputer Communications Corp. (513) 745-0500	ICC/ Intercom 102	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	256K	Provides terminal emulation to Unysis mainframes	Poll/Select	Poll/Select	Yes	No	$295
	ICC/File Xpress	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	512K	Advanced file transfer	Poll/Select	Poll/Select	Yes	No	$495
	ICC/ Intercom 500	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	512K	Provides UTS 20/40 emulation	Poll/Select	Poll/Select	Yes	No	$295
	ICC/ Intercom 1500	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	512K	Provides PT1500 emulation	Poll/Select	Poll/Select	Yes	No	$795
KEA Systems Ltd. (800) 663-8702	Zstem PC	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Emulation and communications, true double-high/double-wide characters, 232-column support, soft key/macros	Kermit, Xmodem	X-on/X-off, EOB/ACK	—	Yes	$99-$150
Metaresearch, Inc. (503) 228-5806	Griffin Terminal	Macintosh operating system	Macintosh	128K	Tektronix 4012 emulation, VT100 emulation	Xmodem, Tektronix 4012, VT100	Xmodem	No	No	$99
Michtron, Inc. (313) 334-5700	Mi-Term	MS-DOS	IBM PC and compatibles	—	—	DFT, ASCII, Xmodem	Xmodem	No	Yes	$49.95
Micro Call Services (301) 776-5253	AM Call	CP/M, MS-DOS	IBM PC and compatibles, CP/M-based systems	64K or 512K	File transfer, terminal emulation	Xmodem, Mcall-T	Xmodem, Mcall-T	No	No	$100-$125
Micro-Integration Corp. (800) 237-5888, (603) 659-5891 (in N.H.)	Acculink	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	128K	Emulation of VT100, VT102, VT52 and IBM 3101, Teletype, Televideo 950, 925, ADM 3A terminal emulation, can be preconfigured to automatically come up into emulation, can configure all standard asynchronous parameters	Xmodem, Datalink	NA	No	No	$195-$395
Microft Labs, Inc. (904) 562-3939	Maxi-Mite	MS-DOS	IBM PC, XT, AT and compatibles	128K	Terminal emulation, file transfer	Kermit, Xmodem, Ymodem	Kermit, Xmodem, Ymodem	Yes	Yes	$49.95

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
Microft Labs, Inc. **(904) 562-3939**	Maxi-Mite Plus	MS-DOS	IBM PC, XT, AT and compatibles	128K	Terminal emulation of VT52, Televideo 925, Zenteck ADM-3A, IBM 3101	Kermit, Xmodem, Ymodem	Kermit, Xmodem, Ymodem	Yes	Yes	$74.95
	Dyna-Mite	MS-DOS	IBM PC, XT, AT and compatibles	128K	12 emulations with Morse programming, encryption/decryption capability	Kermit, Xmodem, Ymodem, Zeta	Kermit, Xmodem, Ymodem	Yes	Yes	$99.95
	Krypto-Mite	MS-DOS	IBM PC, XT, AT and compatibles	128K	12 emulations with Morse programming, encryption/decryption capability, hardware board with DES encryption	Kermit, Xmodem, Ymodem, Zeta	Kermit, Xmodem, Ymodem	Yes	Yes	$249.95
Microsoft Corp. **(206) 882-8088**	Access	MS-DOS	IBM PC, XT, AT and compatibles	256K	Consistent menu structure, built-in interfaces to Dow Jones News Retrieval service, Compuserv, Newsnet, Official Airline Guide, MCI Mail, Easylink	Xmodem, X.PC	Xmodem, X.PC	Yes	No	$250
Palantir Software Co. **(713) 955-8880**	Intalk (for Microsoft Windows)	Microsoft Windows	IBM PC, XT, AT and compatibles	512K	Terminal emulation, file transfer, includes CCL script language, only communications package for Microsoft Windows, text editor	Kermit, Xmodem, Crosstalk, proprietary	Xmodem, Kermit	Yes	Yes	$195
	Intalk (for Macintosh)	Macintosh Operating System	Macintosh 512K, 512E, Mac Plus, Mac SE, Mac II	512K	High-speed modem, built-in editor, CCL script language, terminal emulation, file transfer	Mac Binary, Xmodem, Crosstalk, Yterm, Connect	Mac Binary, Xmodem, Crosstalk, Yterm, Connect	Yes	No	$195
Persoft, Inc. **(608) 273-6000**	Smartmove	MS-DOS	IBM PC, XT, AT and compatibles	320K	Precise VT100 emulation, full European keyboard and character support, advanced soft-key language, dialing directory	Kermit, Xmodem	Kermit, Xmodem	—	No	$149
	Smarterm 400	MS-DOS	IBM PC, XT, AT and compatibles	192K	Precise emulation of Dasher text terminals, smart soft keys	Xmodem, proprietary	Xmodem	—	No	$149
	Smarterm 4014	MS-DOS	IBM PC, XT, AT and compatibles	384K	Precise emulation of Tektronix 4014 graphics terminal, VT100, VT102, VT52 emulation	Xmodem, PDIP	Xmodem	—	No	$225
	Smarterm 220	MS-DOS	IBM PC, XT, AT and compatibles	384K	Precise emulation of VT220, VT100, VT102, VT52 terminals, true double-high/double-wide characters, split-screen capability	Kermit, Xmodem PDIP	Xmodem, Kermit	—	No	$195
	Smarterm 240	MS-DOS	IBM PC, XT, AT and compatibles	512K	Emulation of VT241 color graphics terminal, VT240, Tektronix 4014 monochrome graphics terminal, all DEC text terminals	Kermit, Xmodem PDIP	Xmodem, Kermit	—	No	$345
Polygon, Inc. **(314) 576-7709**	Poly-Com/220	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer	Proprietary	Proprietary, CRC	No	No	$200
	Poly-Com/240	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer, DEC graphics emulator	Proprietary	Proprietary, CRC	No	No	$300
	Poly-Star/220	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	386K	Terminal emulation, file transfer, script language, remote-control features, multinational/international keyboard support, soft remappable keyboard	Proprietary	Proprietary	No	No	$200
	Poly-Star/240	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	512K	Terminal emulation, file transfer, script language, remote-control features, multinational/international keyboard support, soft remappable keyboard, DEC graphics emulator	Proprietary	Proprietary	No	No	$300
Prime Computer, Inc. **(617) 655-8000**	Primelink	MS-DOS	IBM PC, XT, AT and compatibles, 50 series systems, Macintosh, Data Access	512K	Allows Lotus spreadsheet users to extract data, direct access to data base, seamless integration with Prime systems, full PT200 terminal emulation, ability to transmit several files in a batch, easy to use	Hayes modem, RS-232	Yes	No	No	Contact vendor
	PC Interface	MS-DOS	Prime EXL 316, IBM PC XT, AT and compatibles	128K	Allows PC user to initiate Unix programs directly from PC-, MS-DOS prompt, seamless integration with Prime system and PC environment, virtual file system, virtual print, file transfer, terminal emulation	Ethernet, RS-232	Yes	Yes	Yes	Contact vendor
Rabbit Software Corp. **(215) 647-0440**	PC Asynch 200	MS-DOS	IBM PC, XT, AT and compatibles	25K	Allows asynchronous terminal connection to PC for IBM communications	Coaxial IBM 3270, SDLC 3270	NA	Yes	No, proprietary windows	Contact vendor

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
Sceptre Corp. (313) 665-8778	Synchrony, Synchrony utilities	MS-DOS, Unix	IBM PC and compatibles, 40 different Unix systems	192K	Terminal emulation, file transfer, keyboard macros, Unix-oriented interface	None	Xmodem	Yes	No	$245-$395
Simware, Inc. (800) 267-9991	SIMPC	MS-DOS	IBM PC, XT, AT and compatibles, DG laptops, HP laptops	225K	Command language so the product can be completely customized, sophisticated paneling system for accessing other CPUs, PC-, MS-DOS hot key support, background file-transfer support, statistical information on file transfer	Kermit, Xmodem, VT100, Teletype, IBM 3270 emulation	Kermit, Xmodem, proprietary	Yes	—	$250
Softklone Distributing Corp. (904) 878-8564	Mirror 2	MS-DOS 2.0 and higher	IBM PC and compatibles	192K	Crosstalk compatible, background communications, autolearn mode, on-line Help, integrated text editor	Xmodem, Ymodem, Hayes, Crosstalk	Xmodem and Ymodem with CRC option	No	Yes	$69.95
Sourceview Software International (800) 682-2860	The Executive	MS-DOS	IBM PC, XT, AT and compatibles	128K	Integrated desktop productivity package, communications software, supports transfer of source and object code	Kermit, Xmodem, Checksum	Kermit, Xmodem, Checksum	Yes	No, proprietary	$199.95
	Commstar	MS-DOS	IBM PC, XT, AT and compatibles	128K	Full, customizable bulletin board and message center, support transfer of source and object code	Kermit, Xmodem, Checksum	Kermit, Xmodem, Checksum	Yes	No, proprietary	$199.95
Systems Interface, Inc. (613) 230-4103	Step/IV	MS-DOS, MFE	IBM PC, XT, AT and compatibles, Motorola Series 4000, 5000	75K	File transfer between PCs and Motorola systems, turns PC into a Motorola screen	Proprietary	NA	No	No	Contact vendor
Telexpress, Inc. (609) 877-4900	Teleterm EM	MS-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer, unattended operation, autodial/autologon, character translation, transparent printing	Asynchronous	Proprietary, Xmodem, Kermit	Yes	No	$95
	Teleterm EM 4425	MS-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer, unattended operation, autodial/autologon, character translation, transparent printing	Asynchronous	Proprietary, Xmodem, Kermit, upload/download	No	No	$150
	Teleterm X	Xenix, Unix	IBM PC AT and compatibles	512K	Teletype, file upload/download, unattended operation, autodial/autologon, character translation	Asynchronous	Proprietary, Xmodem	Yes	No	$295
Tymnet, McDonnell Douglas Network Systems Co. (800) 872-7654	Smartym 3270	MS-DOS	IBM PC, XT and compatibles	192K	Designed for use with Tymnet's asynchronous-to-3270 service, supports 25th status line, keyboard mapped to emulate 3270 keyboard, X.PC error protection, soft keys	Asynchronous	X.25	No	No	$175
Unisys Corp. (215) 542-2240	PCU	MS-DOS	IBM PC, XT, AT and compatibles	256K	Provides an asynchronous link to Unix-based host systems	VT100, VT200 emulation	NA	Yes	Yes	$175
	PCworks	MS-DOS	IBM PC, XT, AT and compatibles	256K	Provides link to Unix-based host systems	VT100, VT200 emulation	NA	Yes	Yes	$195
	Infoview	MS-DOS	IBM PC, XT, AT and compatibles	256K	Provides Unisys host environment that uses PC as a workstation, works with Unisys A, V series	VT100, VT200 emulation	NA	Yes	Yes	$199
VM Personal Computing, Inc. (800) 84-RELAY	Relay Gold, Relay Silver	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, HP 150, Wang PC	192K	Transfers any file, size checking, data compression	Proprietary, Xmodem, Kermit	CRC, Checksum	Yes	No	$150-$250
Virtual Microsystems, Inc. (415) 841-9594	V-Drive	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	640K	File transfer, terminal emulation, virtual disks	Proprietary	Proprietary	No	No	$2,000-$3,000 (for host price)
Western Wares, Inc. (303) 327-4898	Teled Plus	MS-DOS, CPM, ISIS-II	IBM PC, XT, AT and compatibles, all CP/M systems, all Intel MDS systems	256K	Wildcard Xmodem file transfer, text collection and editing, Hayes modem supported	Xmodem	Xmodem-CRC	No	No	$89
White Pine Software, Inc. (603) 886-9050	Vmac	VMS	DEC VAX	1M	Xmodem and Mac binary, bidirectional conversion between Mac and VMS text files, displays files in directory format using Finder information	Xmodem, Mac binary	Xmodem	No	No	$399-$999
Woolf Software Systems, Inc. (818) 703-8112	Move-It	PC-DOS, MS-DOS, Concurrent DOS	IBM PC and compatibles, most others	128K	Transfers all files, automatic file compression, remote-control functions, scripting system, multiple protocols	X-on/X-off, Wait After Character, Wait After Line	Proprietary, Xmodem with CRC and Checksum	Yes	Yes	$150
Wordcraft (415) 534-2212	The Micro Link II	PC-DOS, CP/M	IBM PC and compatibles, Kaypro	64K	Teletype, keyboard, all types of data files	Xmodem with CRC option	Xmodem with CRC options	No	No	$99
Workstations Products & Services (212) 685-6996	WPSynch	MS-DOS, CP/M, Netware	IBM PC, XT, AT and compatibles	256K	Hooks up to any systems, sends and receives files, works on any type of editing system	Kermit, Xmodem	MNP, proprietary	No	No	$250

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

RISC goes for broke

The technology known as reduced instruction set computing (RISC) is entering a crucial phase in its young but controversial life.

Heralded during the 1970s as an architecture of the future, RISC has been battered by its critics, particularly with claims that it cannot be adequately adapted for commercial computing. Those critics have maintained that it might be nice to reduce the number of instructions used in a CPU — for example, cutting the number of instructions in half, to fewer than 150 — but that there is little benefit if instructions cannot be executed in one cycle or if the machines will not run commercial code such as Cobol.

RISC is now ready to be tested on two fronts. On the technical computing side, where RISC's greatest benefits have been predicted, a second generation of RISC systems is hitting the market. The 10 million instructions per second workstations now being introduced by vendors such as Sun

Continued on page 44

Amdahl widens storage options

High-speed channel arrives; disk-cache feature quadrupled in size

BY JAMES CONNOLLY
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp., which leapfrogged IBM with the announcement of a 4.5M byte/sec. channel feature in September 1986, last week said those high-speed channels are now available and that the company has quadrupled the size of its disk-cache feature.

In addition, the IBM plug-compatible vendor reported that its High Speed Channel Feature (HSCF) can now be used with cache controllers to improve disk performance by as much as 80%.

The HSCF was originally introduced for use with Amdahl's 580 series mainframes and 6680 electronic direct-access storage device, which is a 512M-byte solid-state storage subsystem.

The 4.5M byte/sec. channel speed represents a 50% gain when compared with the 3M byte/sec. channel speed available on most existing IBM and IBM-compatible mainframes.

Twelve times faster?

Amdahl claimed that the combination of a 6680 and HSCF can provide a twelvefold improvement in I/O response time compared with conventional disk drives.

When Amdahl announced the HSCF for the 6680, analysts predicted that IBM's introduction of 4.5M or 6M byte/sec. channels and the disk drives that could handle the increased throughput was imminent.

IBM has yet to announce such products, although Amdahl's plug-compatible manufacturer rival, National Advanced Systems Corp., announced in March a cartridge tape drive that supports 6M byte/sec. channels.

Refreshed memory

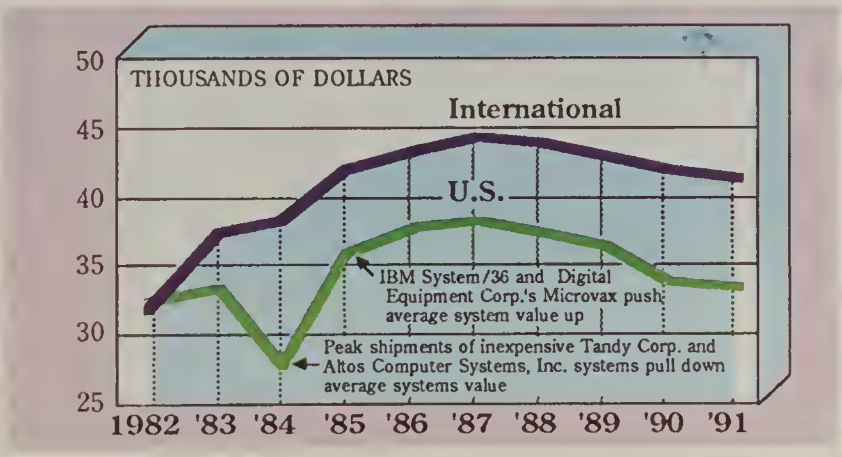
Amdahl increased the maximum cache-memory size for its 6880 controller from 32M to 128M bytes through the use of 1M-bit dynamic random-access memory chips.

The HSCF costs $20,000 per 6680 or cache device. Amdahl said the feature will be available for cache devices in September.

The 6880 cache capacity will be increased to 48M and 64M bytes in September and then to 96M and 128M bytes during the first quarter of 1988, the vendor said. The purchase price of 64M bytes of cache is $306,900.

Data View

Small-scale systems
Trends in average system value



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Publishing line edited

BY STANLEY GIBSON
CW STAFF

STAMFORD, Conn. — Building on its XPS 701 electronic publishing system, Xerox Corp. recently announced a series of products designed to create a corporatewide publishing system.

A key new product, the Xerox 7650 Pro Imager, is a photo-

Continued on page 45

Optical VAX drive debuts

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — EMC Corp. recently announced an optical-disk subsystem for all Digital Equipment Corp. VAX systems. The Archeion subsystem, which offers 56G bytes of storage, can be connected to a VAX with no hardware or software changes, the vendor said.

The Archeion attaches to the computer using a Pertec Computer Corp. interface, which assures compatibility with VAX hardware and software, according to Kevin Fitzgerald, product manager at EMC. A user views the subsystem as a configuration of from one to eight logical DEC TU series tape drives and can address it with standard tape commands, Fitzgerald said.

The Archeion supports three modes of data transfer: between computer and optical disk; between computer and tape drives;

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Inside

- EMC introduces disk subsystem for Prime systems. Page 44.
- HP develops high-capacity Winchester drives. Page 45.
- Raster Technologies announces color graphics subsystem for two-dimensional applications. Page 46.

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HARDWARE NOTES

Intel inks OEM deals; CDC pegs lottery

Intel Corp.'s Systems Interconnect Operation reported that it recently installed six of its **Fastpath** control units in Fortune 500 data centers to establish connections between IBM mainframes and other hosts, such as Digital Equipment Corp. VAX minicomputers. New customers include Eastman Kodak Co. and McDonnell Douglas Corp.

Intel also signed Fastpath-related OEM agreements it said would be worth $3 million during the next 18 months. **Unisoft Corp.** reportedly will add its terminal control and connectivity products to Fastpath for Unix-based Amdahl Corp. and IBM hosts. **Advanced Computer Communications** said it plans to develop driver software to allow operation of a Fastpath controller with its Acces/MVS software, which connects IBM mainframes and other nodes on Transmission Control Protocol/Internet Protocol-based networks.

Control Data Corp. is gambling on expanding one of its niches — the lottery market — with its 4-month-old Cyber 180 Model 930 departmental system. CDC, which announced the Model 930 in March, reintroduced the superminicomputer last month at the North American Association of State and Provincial Lotteries convention in Montreal. CDC already has six statewide lottery networks in place and said it wants to use the Model 930 to expand those networks.

Large computer sites continue to be the most dependent on uninterruptible power supplies (UPS), according to a recent survey by **Computer Intelligence**, a market research firm based in La Jolla, Calif.

The research firm found that 18% of all UPS sites have computers and disk drives that consume more than 100 kVA of power. However, the survey also found a high percentage (29%) of power-conditioning systems were at sites in the 1- to 3-kVA range. In looking at acquisition plans, Computer Intelligence concluded that low demand for UPS systems at large sites indicated a saturation at the high level and that power-conditioning systems will remain popular at the low end.

National Advanced Systems Corp. (NAS) has extended a 1986 development grant under which **Iowa State University** is converting its mathematics library for use on NAS's vector-processing facility-equipped mainframes. The latest

Prime users get faster EMC drive

HOPKINTON, Mass. — EMC Corp. recently brought out the 6000XL-1 disk subsystem for Prime Computer, Inc. systems.

The new drive boosts performance by up to 30% over EMC's previous offering, according to the vendor.

Part of what is planned to be a family of 6000XL drives, the 6000XL-1 features 800M-byte disks that are half as wide as conventional 315M-byte drives. A single subsystem can support up to 3.2G bytes of storage and up to 4.8G bytes can be configured in a cabinet, EMC said.

The 6000XL-1's average access time is 15 msec, and its transfer rate is 2.46M bit/sec., which makes it the fastest subsystem available for Prime users, EMC claimed.

Now shipping, the 6000XL-1 is priced at $23,500 for the subsystem and $15,500 for each additional drive.

RISC

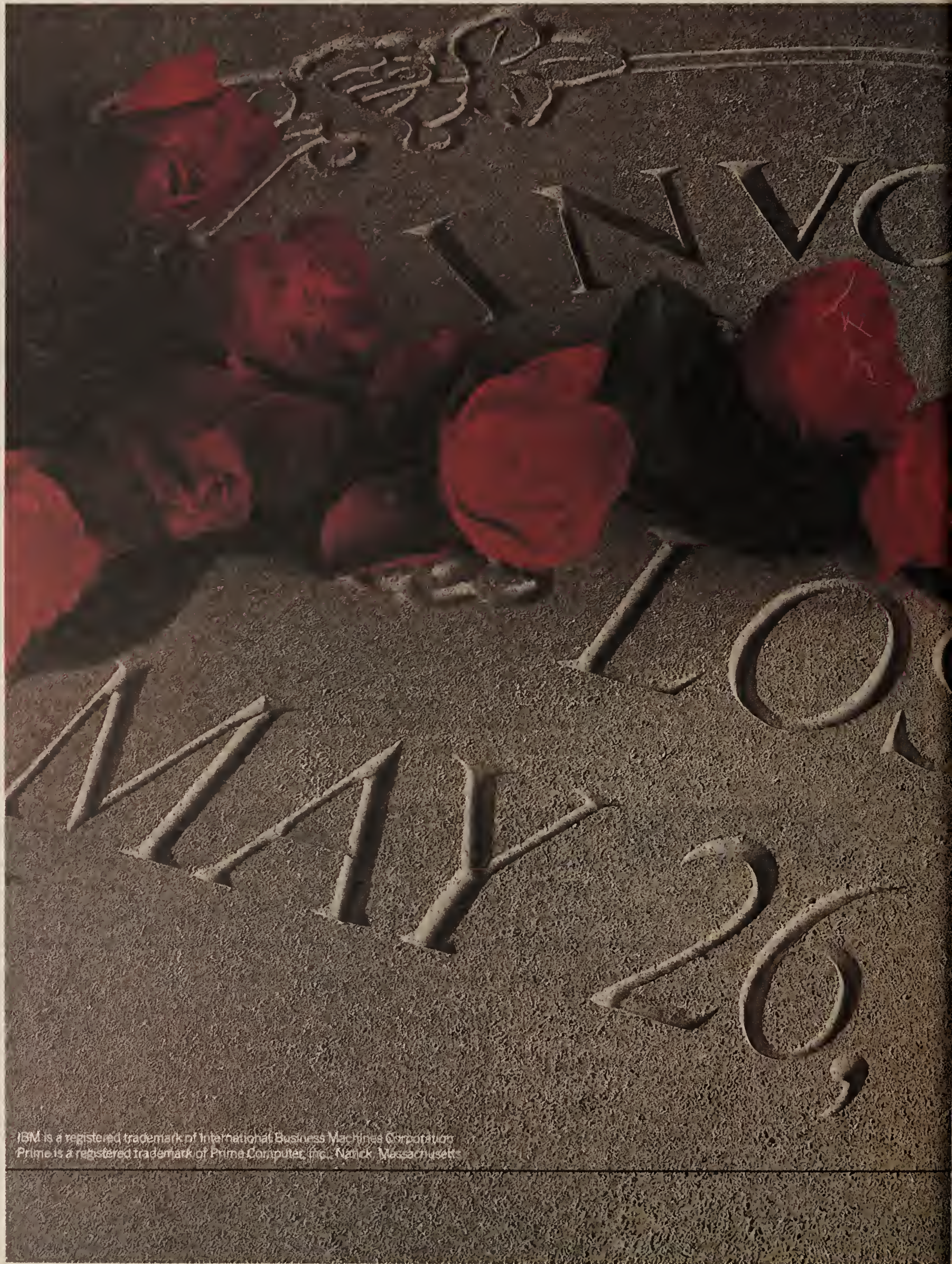
CONTINUED FROM PAGE 43

Microsystems, Inc., Prime Computer, Inc. and Silicon Graphics, Inc. offer several times the performance of earlier products like the IBM RT Personal Computer. Such performance moves RISC-based workstations out of the curiosity stage.

But even more significant is the scheduled delivery of the first Hewlett-Packard Co. HP 3000 Model 930 systems this month. HP, which announced the Spectrum family in February 1986, was the first major data processing vendor to commit its future to RISC. HP deliveries will mark the start of RISC's trial by fire in the commercial marketplace rather than at carefully monitored HP test sites or in the limited installed base of vendors such as Pyramid Technology Corp. and Ridge Computers.

HP officials have acknowledged that they gambled a bit when they committed to RISC, and analysts have noted that the company's future as a computer vendor is largely tied to Spectrum's success. But it also may be that RISC, as a concept, has more at stake than HP itself. One has to wonder if anyone else will commit to RISC if Spectrum fails.

Connolly is *Computerworld's* senior editor, systems & peripherals.



IBM is a registered trademark of International Business Machines Corporation.
Prime is a registered trademark of Prime Computer, Inc., Natick, Massachusetts.

$870,000 grant is an extension of a $130,000 award made last year.

The growth of the parallel processing market has spawned a series of **consultant newsletters** focusing on those systems. One of the latest is "The Serlin Report on Parallel Processing," published monthly by Omri Serlin, owner of Itom International Co. in Los Altos, Calif. The newsletter is priced at $495 per year.

Research group **Datek Information Services** in Waltham, Mass., reported that few of the printers sold in the booming laser printer market are purchased as add-ons to existing systems.

Instead, the printers, which cost an average of $3,660, tend to be just part of a $14,404 transaction that includes a computer, terminals, other printers and software.

Digital Equipment Corp. has announced a series of contract awards, including a $114 million **U.S. Air Force** pact for computer systems to be used in research and development of air defense systems. That contract is separate from an Air Force request for proposal on which DEC recently filed a protest against the requirement of AT&T Unix System V for administrative systems.

DEC also announced a $4.75 million contract to supply United Press International, Inc. (UPI) with systems to support business operations and UPI's news network.

HP broadens OEM drive line

PALO ALTO, Calif. — Hewlett-Packard Co. recently introduced two high-capacity 5¼-in. Winchester disk drives for the OEM marketplace.

The announcement is the latest in a series of OEM disk drive announcements by the company. Since last year, Hewlett-Packard has offered two other disk drives to the OEM market.

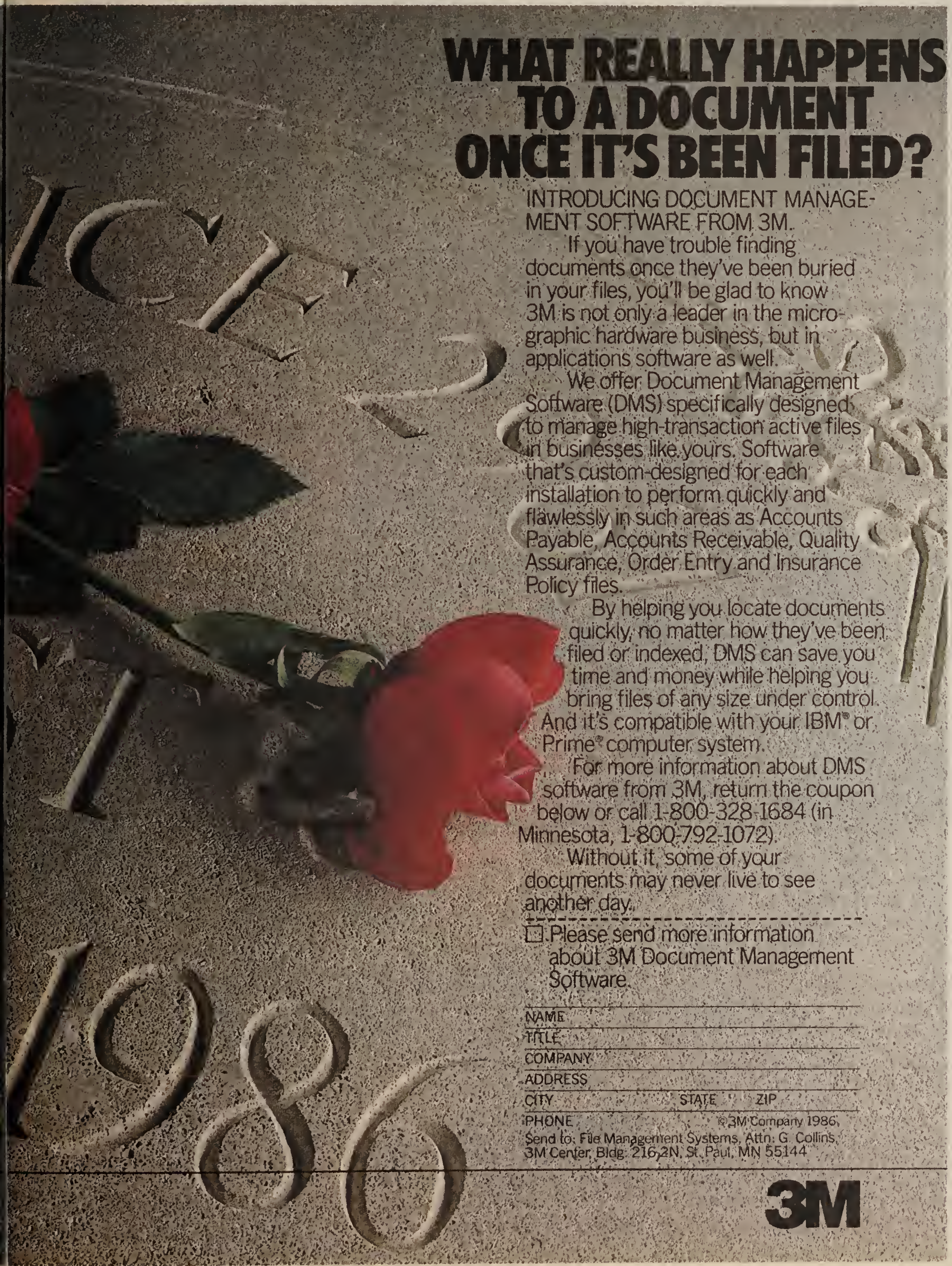
In July 1986, the company announced the HP 97501B, a 3½-in. drive with a 28M-byte capacity.

Shortly thereafter came the HP 7937S, an 8-in. disk subsystem with 715M bytes of storage.

HP currently has more than 10 contracts signed for the 3½-in. drive, a spokesman said. The company just signed a "very large" contract for the 8-in. drive and expects to have two more signed by the end of this month, according to the spokesman.

The HP 97530E and HP 97530S are available with unformatted capacities of 129M, 194M and 389M bytes. Two interfaces are available.

For OEM sales, the 389M-byte enhanced small device interface- and small computer systems interface-based disk drives typically cost $1,900 and $2,050, respectively, in quantities of 1,500 or more.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Publishing

CONTINUED FROM PAGE 43

graph and illustration scanner that offers 600 dot/in. resolution and is priced at $8,500. The scanner is to be used with Version 2.0 of the Xerox Publishing Illustrator's software, which enables users to view an illustration before scanning it into the workstation for editing and annotation. The software also allows reduction, enlarging, or cropping of the image, Xerox said.

Another product introduced for the publishing system is Version 4.0 of the XPS 701 software. Version 4.0 allows for multiterminal publishing by linking Xerox 6085 workstations and the Xerox Publishing Illustrator's workstations with its XPS 701 system via an Ethernet local-area network.

A multiterminal configuration of the XPS 701 requires 300M bytes of hard-disk storage, which Xerox offers in a peripheral cabinet designed for the XPS system.

Xerox also announced price reductions on its XPS 701 electronic publishing system and on its XICS mainframe composition software.

The price of the entry-level XPS 701 has been reduced to $55,000 from $68,000. XICS mainframe composition software has been reduced to $6,000 from $32,000.

VAX drive

CONTINUED FROM PAGE 43

and between tape drives and optical drives. Thus, a user may move data from tapes to optical disks without tying up the CPU, Fitzgerald explained.

The optical drives may also be taken off-line without interrupting system activity, he said, a feature that can make troubleshooting easier.

The subsystem is the first of a series of scheduled mass-storage products for VAX computers, signaling a change from EMC's previous focus on memory and memory-system conversions, Fitzgerald said.

EMC plans to introduce an optical-disk system that attaches to a DEC HSC50 controller and a high-performance tape storage system similar to DEC's TA78, he said.

The optical drive and peripherals controller, priced at $42,000, will reportedly be available in September. Additional drives are priced at $12,000.

NEW PRODUCTS

Processors

A control system said to integrate a real-time industrial computer with a programmable controller has been announced by **Gould, Inc. Industrial Automation Systems.**

The **C986** integrated control processor uses C programming to handle calculations, generate reports and link incompatible devices. Up to three of the single-board devices can be used on one system.

Data is sent and received via four serial ports that can be configured as RS-232, RS-422 or RS-485.

The C986 integrated control processor is priced at $7,600.

Gould Industrial Automation Systems, One High St., North Andover, Mass. 01845.

Graphics systems

Model One/85, a color graphics subsystem designed for two-dimensional graphics applications, has been announced by **Raster Technologies, Inc.**

The Model One/85 supports a video format of 1,280 by 1,024 pixels. According to the vendor, the unit's image-memory architecture supports options such as double buffering, multiple independent displays and 8-bit pre-emptive graphics overlays.

Other features include on-line Help, command stream translator and interactive debugger, macro programming and local shading and display list.

Prices vary depending on configuration. An 8-bit increment memory unit (IMU), single buffered, costs $18,500. A 16-bit IMU, double buffered or double headed, costs $24,000.

Raster Technologies, Two Robbins Road, Westford, Mass. 01886.

Data storage

The **VS-IDC**, an intelligent disk controller for Wang Laboratories, Inc.'s VS 85, 90 and 100 computers that is equipped with a Motorola, Inc. 68000 microprocessor and supports up to four drives, has been announced by **EMC Corp.**

The VS-IDC provides 64K bytes of first-in, first-out memory, which is said to allow the system bus to interface with Winchester disk drives, including the 620M-byte drive. The controller also supports a 76M-byte removable cartridge drive.

Features include power-up self-diagnostics with a four-digit LED readout; power-on, activity and fault lights to monitor board status and usage levels; and an on-line/off-line comfort switch.

The VS-IDC is priced at $9,500.

EMC, 171 South St., Hopkinton, Mass. 01748.

Terminals

IIS, Inc. has announced options and features for its **IS-391** ISM 3191 plug-compatible workstation.

The standard IS-391 consists of a green or amber 14-in. display in a tilt-and-swivel cabinet, a logic unit and a 122-key keyboard. It connects to IBM or IIS 3174 and 3274 type controllers and the 3299 type multiplexers. It is supported by native and emulation modes.

Available options include direct attachment of a bar code reader, wand and magentic-card reader; built-in coaxial doubler; integrated interface for parallel printers; and an 87-key compact keyboard.

The basic unit costs $1,095.

IIS, 92 Kansas St., Hackensack, N.J. 07601.

Printers/Plotters

A laser printer designed for use with the IBM System/34, 36 and 38 has been announced by **Acom Computer, Inc.**

The **LO8219 Executive Laser Printer** has an internal twinaxial interface allowing direct twinaxial attachment to IBM minicomputers. Other features include 8 page/min print speed, software support for IBM's Displaywrite/36 and a built-in sheet and envelope feeder.

The LO8219 costs $3,995. It can be leased for $149 per month.

Acom Computer, 3534 Atlantic Ave., Long Beach, Calif. 90807.

Harris Corp. has announced three dot matrix printers and a screen printer for its Challenger 3270 information display systems, which are plug-compatible with IBM 3174 and 3274 controllers.

The **H087-01** is a Coaxial A, dot matrix printer offering a 220 char./sec. draft mode, a 188 char./sec. compressed-quality mode and a 44 char./sec. near-correspondence mode. Features include IBM 3287 compatibility and bidirectional printing.

The **H224-200** and **H224-400** dot matrix printers offer draft and near-letter-quality modes.

The H224-200 also offers high-speed draft mode for uppercase printing at 300 char./sec.

The **H286-01** screen printer offers draft printing at 120 char./sec. and correspondence printing at 24 char./sec. It includes a parallel interface and international character sets.

Prices are $2,885, $3,985, $5,600 and $495, respectively.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248.

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IN DEPTH

When you're asked to cost-justify systems . . .

A good benefit analysis model can satisfy the bottom line

BY A. PERRY SCHWARTZ

Advocates of advanced technology bemoan the fact that management is turning an increasingly skeptical eye on the benefits of information and computer technology. Executive sponsors who welcomed office automation projects a few years ago are much slower to embrace today's local-area network or artificial intelligence proposals.

The day of reckoning for information system budgets draws near. In this atmosphere, any recommended computer project must have ample prospects for solid, real-dollar payoffs. Yet, payoffs become more difficult to assess as information technologies — office systems, personal computers, expert systems and application enhancement projects — are increasingly directed at improving the performance of white-collar workers.

In fact, in the absence of headcount reduction, there are no easy ways to assess improvements in white-collar productivity. This situation is problematic because many, if not most, successful end-user computing projects actually raise direct costs and do not decrease the labor force at all.

Gauging success

This does not mean there is no payoff but that measuring the results requires different, more appropriate models.

More often than not, the problem lies with white-collar productivity measurement techniques, not with information technology.

Although a number of approaches to measuring productivity have been proposed, there is simply no methodology that can be used without fail to link computer technology to white-collar productivity payoffs. In fact, quite the opposite is true.

Thus, for meaningful evaluation, I advise considering the use of one or more models from a portfolio of cost-benefit analysis techniques. In this article, a variety of techniques are organized and discussed, each with its pluses and minuses.

Direct output models

The most appealing and straightforward techniques for cost-benefit analysis are those that model the flow of costs and revenues by explicitly and mechanistically representing how improvements in one area will have an effect on a bottom-line measure of financial performance such as revenue or profits. I call these direct output models.

In 1978, Fred McFadden and James Suver described the use of this approach in a *Harvard Business Review* article, "Cost and Benefit of a Data Base System." They showed how the introduction of a data base management system increased sales and production while reducing operational costs at Apex Products, a manufacturer and distributor of consumer products. At Apex, the results were observable and clear-cut, and a dollar value could easily be placed on the increased sales.

More recently, Dean Meyer and Mary Boone documented 120 computer applications in which dollar payoffs could be calculated on the specific, verifiable changes that resulted. Their book, *The Information Edge*, published in Canada this year by McGraw Hill, Inc., presented an excellent, comprehensive assessment of payoffs using the direct output approach.

During the past few years, fellow colleague Peter Sassone and I have developed a general direct output model format for projecting increased cash flow or revenue acceleration. For instance, in a large regional bank, we showed how the introduction of office automation would produce a 50% increase in the number of contact hours between bank officers and prospects with a projected increase in revenue of 15% to 25%.

Minimum of assumptions

The major advantage of direct output models is that they are essentially operational rather than analytical. By this, I mean they are based on explicit interpretation of a firm's financial data and require a minimum number of assumptions and inferences. In most instances, you must only assume that historical

WILLIAM CONE

Schwartz is president of Computer Research Associates, Inc., a software development and consulting firm in Atlanta. He has contributed to several handbooks on managing office automation and end-user computing.

• **Direct output vs. inferred input**

• **How to account for lost time**

• **Measuring white-collar productivity** patterns of growth or revenue are going to continue for a limited period of time.

Furthermore, benefits are calculated using standard accounting techniques. This means most executives will be comfortable with the model, finding it similar to those used for standard capital-investment decisions, and they will readily comprehend the results.

Unfortunately, while it is a relatively simple matter to construct direct output models to measure the dollar value of productivity gains in manufacturing activities, tracing improvements in white-collar work to the bottom line, especially in large corporations, is usually difficult and often totally infeasible.

The reason is that the output of white-collar activity is frequently intangible, uncountable and not easily related to revenue. This means numbers to make the calculations and build the model are unavailable.

Additionally, we have found that, even when a model can be created for a particular unit or department, managers in other departments frequently greet it with skepticism, which makes the results difficult to sell across the organization.

So the more a computer system is focused on improving the productivity of white-collar workers, the less viable a direct output model of benefits is likely to be. In such cases, it is useful to turn to cost-benefit analysis techniques that rely on inferring rather than directly measuring increases in output.

Inferred output models

Inferred output models are an alternative to direct output models. There are two main models of this type.

The first, a consensus model, was used successfully at GTE and described in the *Best Quality and Productivity Report* by David Shay of Peat, Marwick, Mitchell & Co. The consensus model projects benefits by seeking agreement among managers on the range of the payoff expected from the introduction of a specific computer technology.

For example, the managers may decide that a department can turn out 10 more research reports a year by using desktop publishing. The managers may be asked to estimate the value of the reports and then share their estimates and reasoning.

> THE TIMES-savings/times-salary model cannot distinguish between making a white-collar worker a better manager or analyst or making that worker a better clerk or receptionist.

Based on repeated estimation and sharing, a consensus might be formed that these additional reports are worth at least $1 million but less than $1.5 million in extra annual revenue.

A good consensus model will use data such as profit per employee, sales figures, market research, costs of operations or other financial data to set upper and lower limits. However, you should recognize that, regardless of the bounding techniques, the estimates are basically subjective.

Consensus models are most appropriate for judging potential payoff when there is a limited quantitative basis for making estimates of value.

This may be the case with information systems that require major organizational restructuring, operational changes, innovations or new ways of conducting business.

In such cases, a consensus model is best thought of as a method for risk assessment or forecasting rather than for strict weighing of costs against benefits.

For instance, I worked with Ellett Brothers in Chapin, S.C., the largest wholesale gun dealer in the U.S. This firm completely substituted telephone sales for direct sales. Although extrapolations from early trial telephone sales efforts were made, acceptance among the general customer set was impossible to gauge.

The president, Chilton Ellett, had to look beyond the numbers and decide to accept the risk — a decision that proved to be immensely successful. In five years, the company's annual sales grew from approximately $2 million to $100 million.

Bayesian theory

The second type of inferred output model is based on Bayesian probability theory. This model reflects the classic view of information and decision making in organizations: More information leads to a lower probability of bad decisions (dollar losses) and a higher probability of good decisions (dollar gains).

For example, an information system might be expected to assist a bank loan officer in increasing the number of loans accepted that are paid in full while decreasing those that go into default.

This has obvious economic value to the bank, and, if the probabilities of accepting good and bad loans can be determined, a close estimate of the dollar payoff can be projected.

Unfortunately, there is little evidence to support the view that more information improves decisions or boosts their payoff. Indeed, Hillel Einhorn at the University of Chicago and Terry Connolly at the University of Arizona, respected researchers of decision making, have produced evidence suggesting that, under many circumstances, more information may actually lead to worse decisions.

Moreover, even if more information were to lead to better decisions, the probability estimates required for the Bayesian model are often impossible to determine. Thus, I have found Bayesian probability models are rarely practical.

Direct input models

Direct input models are useful when inputs can be exactly determined, but outputs cannot be measured. The most common direct input model is a cost or labor displacement model.

Although direct input models involve no output measurement, there is always the assumption, explicit or implicit, that outputs at least remain at the current level. If this is actually true and if inputs such as head counts are cut, then productivity (output divided by input) clearly can be inferred to have increased, although the absolute amount of the increase cannot be determined.

The biggest plus for cost displacement models is their extreme simplicity. They simply require that real labor cuts be made or actual equipment savings be achieved in response to the introduction of new information technology.

For example, a department that bases its benefits on a 10% average salary savings must actually dismiss 10% of its work force when the computer system is installed. On the other hand, without a real cut in head count or equipment costs, cost displacement models are inappropriate.

Inferred input models

In my experience, inferred input models are the most frequently used type of cost-benefit analysis models for information systems. These models differ from direct input models in that they use projected increases in efficiency and effectiveness among workers rather than actual, verified cuts in labor or head count.

Generally, these projections are based on the development of a task/time matrix that jointly reflects the amount of time workers devote to activities and the time-saving impact of computer technology.

The most common model of this sort is attributed to IBM and is an outgrowth of extensive research by Booz, Allen & Hamilton, Inc. In this formulation, office professionals are asked to estimate the time they spend in specific activities, such as reading, typing and talking on the telephone.

Suppose employees report that 20% of their workday is spent reading; the projection might be that an office system will provide the basis for a 10% reduction in that time. Then the savings are figured as follows: 20% multiplied by a 40-hour week, multiplied by a 10% reduction multiplied by an hourly salary.

This times-savings/times-salary (TSTS) model is disarmingly simple and easy to use but flawed. Harvey Poppel, the principal architect of the current formulation of TSTS, found that professionals spent about 50% or less of their time on activities they rated high in value and the remainder of their time on quasi-professional, clerical and totally nonproductive activities.

So the flaw in the TSTS model is that it counts time saved on lower value activities as being equivalent to savings on higher value activities.

In other words, TSTS cannot distinguish between making a white-collar worker a better manager or analyst or making that worker a better clerk or receptionist.

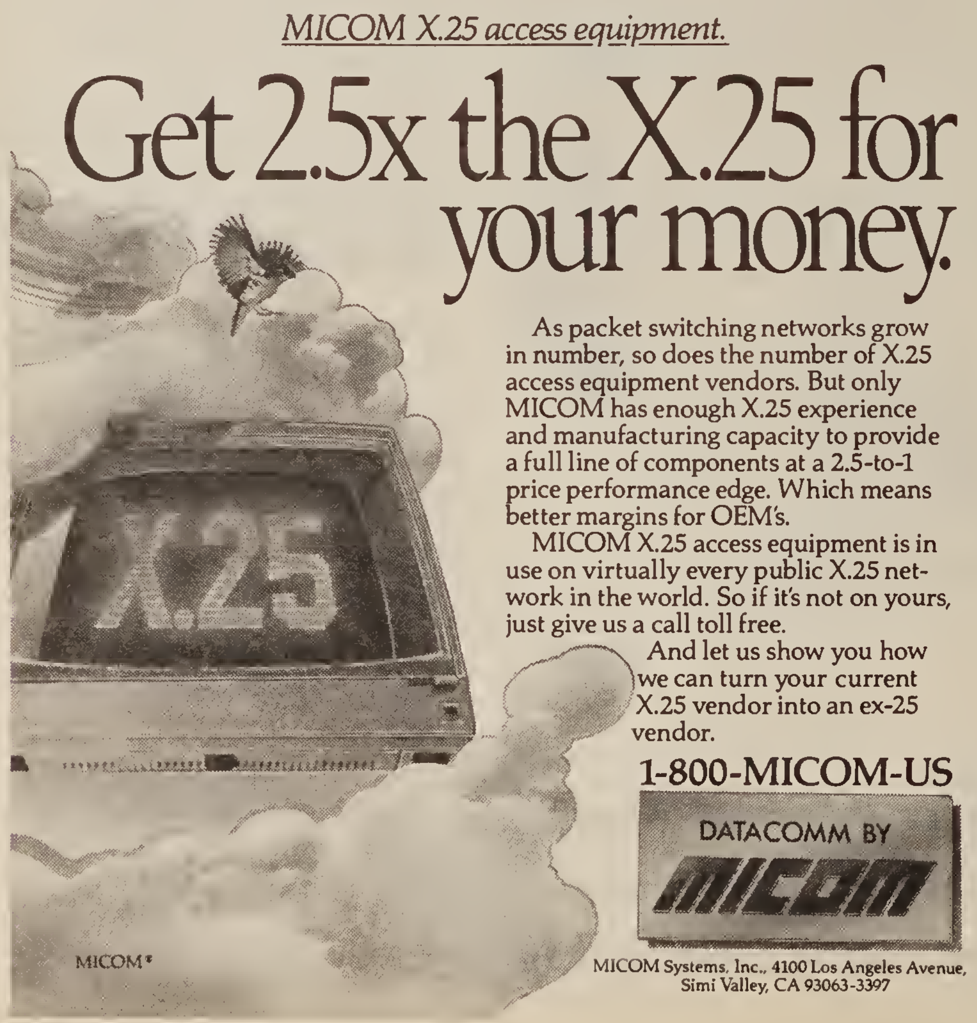
On the other hand, the simplicity of TSTS is appealing when applied to a situation in which growth in volume or revenue is reasonably certain, in which time savings is expected to be approximately equal across all activities and in which there is a commitment to keep a cap on head count. I suggest TSTS be applied only in such cases.

A hybrid model

In response to problems in using direct output models and shortcomings with inferred input models, my colleagues and I developed a hybrid model called work value analysis (WVA). This model evaluates the payoff from computer technology as it impacts the effectiveness and efficiency of white-collar workers.

WVA is based on recognizing that white-collar workers regularly engage in a wide variety of activities. Some activities directly advance the purpose of the organization and reflect the primary reasons for which the organization was formed and the workers were hired.

This might be an engineer reviewing design specifications or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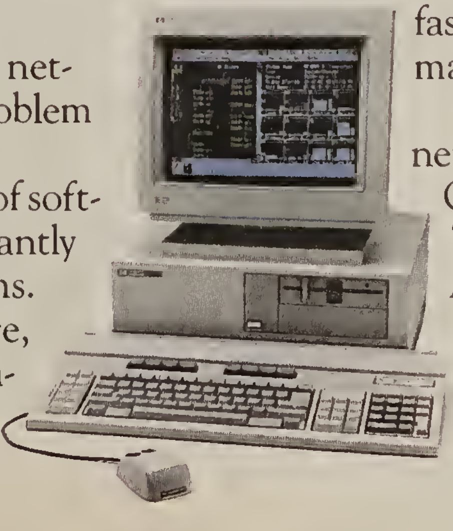

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Chicago Elect. Sales  PDP8        01 terminals   no workstations
2nd Street Banking    8600        52 terminals   10 workstations
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an accountant performing an audit. These are primary or high-value activities.

However, it is unrealistic, if not impossible, for white-collar workers to restrict their work to primary activities. In fact, we have found that office professionals spend only about 35% of their time on the key parts of their jobs. This is not because they are somehow lazy or inept, but because constraints of management, environment and budget frequently necessitate that white-collar workers engage in their own support and clerical activities. It turns out that these support and clerical activities take up approximately another 45% of a professional's time.

Finally, about 20% of professionals' time is lost time. This includes such activities as looking for misplaced, mislabeled and misfiled information, traveling and waiting for others. This time is not deliberately wasted but must be considered lost because it does nothing to further an organization's mission.

Productivity improvements

The WVA model accounts for two types of white-collar productivity improvements. First, technology can shorten the amount of time required to complete a given task, or it can allow more of the task to be completed in the same amount of time. This is efficiency.

Second, technology can be the basis for managers and professionals to shift their work pattern so that more time is spent on primary activities and less on the lower value activities involved in support, clerical and lost time. This is effectiveness, and it is this shift in the professional work profile that produces the most valuable productivity improvement. Unlike the previously discussed conventional cost justification and productivity measurement methods, WVA explicitly accounts for effectiveness.

The key to using WVA to assess payoff is to recognize that, over the long run, a going concern cannot pay more for work than the value of the output. Therefore, wages can be regarded as a reasonable lower boundary for the value of white-collar activities. With wages as a benchmark, the dollar worth of changes in work patterns can be determined analytically.

Consider, for example, a group of secretaries who spend 80% of their time on clerical work and 20% on lost time. If each secretary costs the company $20,000 in salary, benefits and overhead, and we already know that lost time is worth nothing, then clerical work must be worth at least $25,000 on an annual basis ($20,000 divided by 80%).

Likewise, suppose professionals in the same department, with an average loaded salary of $50,000, spend 50% of their time doing professional work, 30% clerical work and 20% as lost time.

We already know that lost time is worth $0, and clerical work is worth $25,000 per year; therefore, professional time must be worth at least $85,000 on an annual basis. This figure is determined by solving the following equation:

— 50% multiplied by the value of professional work;

— Plus 30% multiplied by $25,000 (value of clerical work);

— Plus 20% multiplied by $0 (value of lost time) = $50,000.

Given these sample numbers, if professionals were to accomplish 5% more professional work and less clerical tasks, the value to the firm would be 5% multiplied by $85,000 (the value of the additional professional time) minus 5% multiplied by $25,000 (the value of the clerical work that is being off-loaded from the professional to the secretary). This is a total gain of $3,000 per professional per year.

Keep in mind that this is a simplified example. The full model, based on a linear system with constraints, requires the construction of a set of simultaneous equations, one for each classification or job level, to be solved statistically.

The strength of WVA is that it permits objective determination of payoff when external dollar criteria, relating to profit or value of work, other than salary, cannot be measured or otherwise inferred.

On the other hand, the use of WVA requires significant efforts, such as time logging, to objectively determine work activity profiles, and the mathematical calculations can be complex.

Gaining understanding

The goal of cost-benefit analysis is to permit a fair determination of an investment's worth. The keys to successful application of cost-benefit analysis are:

- Use objective rather than subjective data whenever possible.
- Use more than one method if possible and compare results.
- Make sure the methods and results address the major issues and are comprehensible to nontechnical professionals.
- Do not be satisfied with projections but insist on follow-up studies.

Of course, cost-benefit analysis for computer systems, regardless of the elegance of the models, has little meaning without an appropriate organizational response. If information technology is to successfully improve white-collar productivity, management must assure that the staff actually learn and use the new tools, that the organization responds to take advantage of the new technology, that the enhanced capabilities of workers are recognized and channeled and that those who are successful at making the technology pay off are rewarded. Otherwise, results will be disappointing.

Without these organizational changes and insights, a workstation may be little more than an expensive paperweight, and numbers produced by a cost-benefit analysis will have little meaning beyond documenting what might have been. •

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MANAGEMENT

TAKING CHARGE

Jack Bologna

Computer insecurity

As long as computer crimes were being committed by programmers, analysts, data entry clerks, console operators and hackers, the general public showed no great concern or alarm. But even then, data security managers saw a far more serious risk in the offing as computer technology became less expensive and simpler to use and as information systems became more accessible to more people.

The computer frauds discovered in earlier days were sometimes ingenious but rarely expensive monetarily. A few poorly drafted computer crime laws were passed, and everyone hoped that the problem of high-technology crime would go away.

But the problem hasn't died down or gone away; nor is it likely to stop anytime soon. High-tech crime is here to stay. Why? Because there is a lot of money to be made in it and the probability of being caught is very low.

Theoretically, there are several layers and types of controls intended to deter and detect high-tech crimes, such as audits and other organizational controls. But those controls rest on the theory that general managers and accountants are more knowledgeable about defenses to fraud, theft and embezzle-

Continued on page 56

McKesson scouts managers

Firm's top MIS exec seeks systems experience, teaches business

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — Individuals who are skilled at managing programmers and other computing professionals are as rare as they are valuable, according to John Fitzgerald, McKesson Corp.'s vice-president of information services.

At McKesson, a distributor of drugs, toiletries, liquor and chemicals with sales of $6.3 billion last year, the chore of selecting and training such managers is the most serious personnel-related challenge the company's MIS organization faces, according to Fitzgerald.

Not all managers, especially those who are accustomed to dealing with clerical or administrative staff, have the know-how to give systems technicians the wide latitude they seek and, at the same time, keep them under control. But if individuals have the necessary management knack, McKesson has learned through experience how to identify and cultivate them.

Rare breed

To manage systems technicians effectively requires a deft touch, if only because of the unusual nature of the employees being managed. Programmers, systems analysts and others of their ilk are truly a breed apart. Unlike many other categories of white-collar workers, computing specialists favor job settings that afford them a high degree of professional autonomy, stimulation and task variety, Fitzgerald says.

They thus contrast sharply with their clerical and other nontechnical counterparts, who typically prefer to have a well-defined routine and to receive detailed instructions from their superiors, he adds.

To achieve the best possible results from systems personnel, supervisors have to adopt a fairly light-handed management style that takes into account their charges' strong need for independence and professional growth.

On the other hand, even DPers require a minimal level of direction to ensure that they and their employers are always working toward the same end.

The trick, therefore, in managing technical employees "is to reconcile their personal needs with the larger goals of the organization as a whole," Fitzgerald says.

McKesson's greatest successes in finding individuals who can manage MIS professionals have been with employees who already have two to five years of experience in information systems, he said. The company then

Continued on page 57

West, Northeast split highest DP pay honors

BY DAVID A. LUDLUM
CW STAFF

The highest paying jobs for data processing managers in the U.S. are in the Northeast, while the best pay for programmers and analysts is found on the West Coast, according to a recent study.

DP professionals in the Northeast generally earn less than their West Coast colleagues but tend to catch up with and surpass them if they work their way up to management, according to a report by Dunhill Personnel Systems, Inc.

Salaries for professionals are higher along the Pacific because of the relatively strong demand for the available supply of workers, says Rick Kean, director of national operations for Dunhill, a recruitment firm based in Carle Hill, N.Y. But a concentration of large data centers in the Northeast boosts pay for managers there, Kean says. "I would have to think that's because, on the average, the size of the DP operations tends to be a little larger, there are more corporate headquarters and more data processing centers per geographic area." Both areas offer far better DP salaries than other regions of the country, Kean notes.

Average salaries for a programmer last year were $33,000 on the West Coast, $32,200 in the Northeast and $29,400 for the U.S. as a whole, according to Dunhill. Average salaries for data processing managers were $51,000 in the Northeast, $44,300 on the West Coast and $44,200 overall.

In the South, the salary pattern of the Northeast and West Coast is reversed, with the Southeast offering better wages for programmer/analysts and DP auditors and the Southwest providing higher pay for systems analysts, systems programmers and DP managers.

The highest DP salaries overall were registered in the Northeast, followed, in order, by the West Coast, Southwest, Southeast and North Central regions.

Average pay

Average U.S. salaries for data processing positions, according to an analysis of placements made by Dunhill Personnel Systems

Programmer	$29,400
Programmer/Analyst	$29,500
DP auditor	$34,800
Systems analyst	$35,000
Systems programmer	$38,100
DP manager	$44,200

INFORMATION PROVIDED BY DUNHILL PERSONNEL SYSTEMS, INC.
CW CHART

MANAGERS ON THE MOVE

Navy veteran sets strategic course

The **Inmont Division of BASF Corp.** has turned to an unusual sector in seeking an information systems manager with business expertise — the U.S. Navy.

John M. Shiels, who will serve as Inmont's director of information services, actually comes from Equitable Life Leasing Corp. in San Diego, where he was vice-president of information systems for two years.

But prior to that experience and a stint at Flexivan Corp. in New York, Shiels spent 20 years in logistics and financial and general management with the Navy Supply Corps, which he described as "the businessmen of the Navy." A graduate of the U.S. Naval Academy, he earned the Navy's equivalent of an MBA with a DP concentration. He retired a commander.

"I believe they were looking for someone with a strong business background who could relate to the users," Shiels said of his latest appointment. "Basically, my role is to help analyze business problems and ascertain whether there is technology out there so we can solve that business problem in a better way."

Shiels said the Navy Supply Corps offers outstanding training in management, particularly in logistics and finance. "You learn to make the most of limited resources," he said.

Inmont's Shiels

Inmont, a maker of automotive coatings and printing inks based in Clifton, N.J., was recently purchased from United Technologies Corp. by BASF, a major chemical company based in West Germany. Shiels succeeds **Michael Freeman**, who retired.

Shiels said the division, which uses equipment from the former Burroughs Corp., is moving from a batch-oriented environment to distributed processing and pushing information out to users. The idea is "to get information in the hands of the decision makers in time for it to be meaningful — to get the information out to where it can be used," he said.

Inmont also aims to employ information systems in a strategic manner, Shiels said. The division is starting a project to use artificial intelligence to capture knowledge of soon-to-retire technical service personnel who work with customers. "We want to make use of that corporate asset they have in their heads and distribute it to other people," Shiels said.

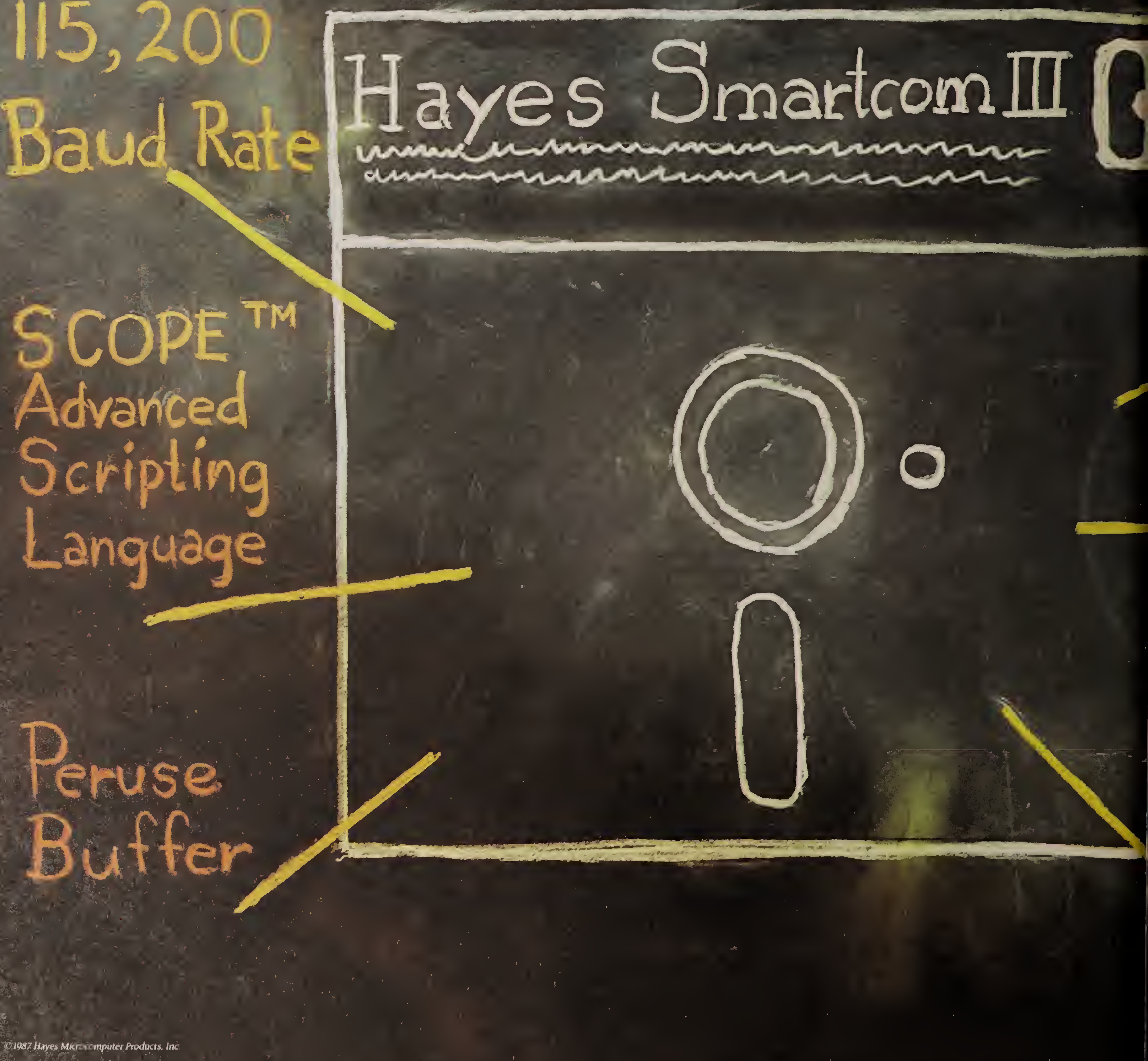
Murdic G. Coleman has been appointed director of the **Wayne State University Computing Services Center** in Detroit.

Before coming to the university, Coleman was director of the Wayne County Department of Information Processing. From 1972 to 1979, he worked at Ford Motor Co. as a supervisor of business systems and operations, a computer specialist and a methods-and-systems analyst. Previously, he was a programmer/analyst for Uniroyal, Inc.

Terry Medlin has been pro-

Continued on page 58

THIS TIME WE OUTSMARTED



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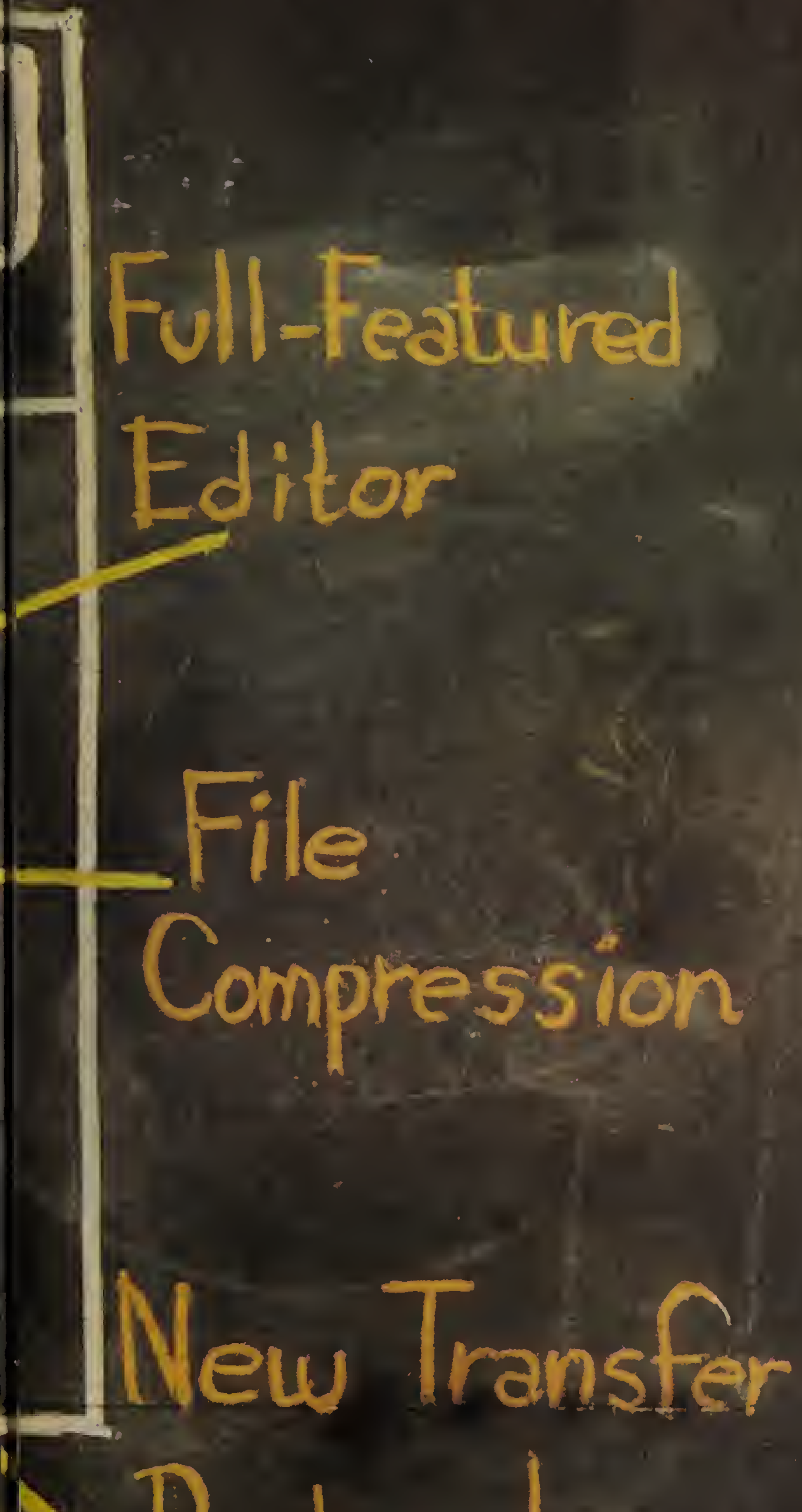

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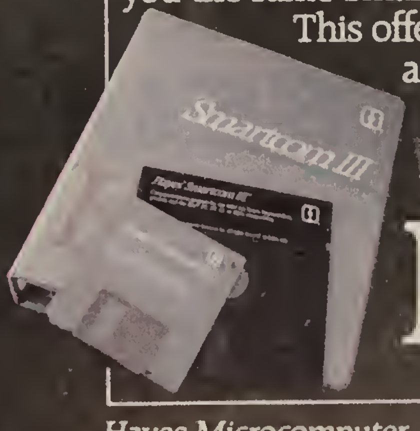

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Insecurity

CONTINUED FROM PAGE 53

ment than wiley, corrupt and incompetent employees are about methods to compromise the systems of control. Experience, if not logic, suggests the opposite. Defense follows offense. So the criminal mind always has a lead. The critical question is: Has the application of modern technology to accounting systems provided more lead time to the criminal? If so, we may have a greater social threat today from high-tech crime.

The granddaddy of computer-related crimes is the Equity Funding case, in which an insurance firm deceived its stockholders for many years by falsely representing its revenue and profits. Both were grossly inflated. Revenue was overstated to the tune of $200 million. The technique was simple: The company merely stated it had sold more insurance policies than it really had. The ploy used to deceive company auditors consisted of generating fictitious policies for fictitious people. This continued for five years and involved 200 company employees, including top managers, most of the EDP staff and even an outside auditor.

> HIGH-TECH crime is here to stay because there is a lot of money to be made in it and the probability of being caught is very low.

Why was the fraud so difficult to detect? Wrapped in a conspiracy of such large and diverse proportions, how could any mortal auditor discover the ruse? It was uncovered only when a disgruntled employee left the firm and blew the whistle to an investment adviser whose clients had a fair-size stake in the company. The adviser, in turn, notified the Securities and Exchange Commission.

Other reasons for the difficulty in detecting the fraud included the following:

- Audit tools available at that time were inadequate.
- Auditors were not knowledgeable enough about auditing in a computerized accounting environment.
- Auditors were inadequately trained by their firms and poorly educated in colleges.
- Auditors were not equipped to deal with the fast-changing world of financial services.

These are rather serious charges. But Equity Funding took place in the late 1960s and early 1970s. We've come a long way since then — but so has computer technology. And unfortunately, the gap between computer technology and audit, accounting and management controls hasn't shrunk at all. If anything, it has grown.

Take as another example the recent Volkswagen AG case, in which it appears that someone inside VW, and perhaps another person outside the firm, manipulated the auto maker's accounting records to cover up $259 million worth of trading losses on foreign currencies. The losses occurred in 1984 but went undiscovered until March of this year. The critical question is, Did technology inspire the crime? I don't think so. The case involved incompetence or bad luck more than an evil intention to steal money from the company. But technology provided a method to cover up the fraud.

Frauds worth $10 billion?

My hunch is that in the float of the world's banking system today, there may be as much as $10 billion in specious electronic funds transfers that cover up employee frauds, thefts and embezzlements. Look at the Iran-Contra affair.

Even the most technologically sophisticated country in the world can't trace $20 million in arms sales beyond the cover of the banking system of Switzerland. With 24-hour global banking and trading markets available today, money can be electronically whipsawed through 100 countries and 1,000 accounts in a matter of minutes. Who is prepared to deal with such an audit trail?

The point is that high-tech crime is here to stay and will continue to grow until we shift from a crisis mode of audit and control to a preventive mode. Prevention means awareness, education, training and early involvement of auditors in the design of new systems. Even if we do all of this, we won't completely solve the problem of high-tech crime. We never will. For, as University of Western Ontario Professor John M. Carroll says, "There is no such thing as computer security. There are, however, relative levels of computer insecurities."

Bologna is an assistant professor of management at Siena Heights College in Adrian, Mich., and president of Computer Protection Systems, Inc.

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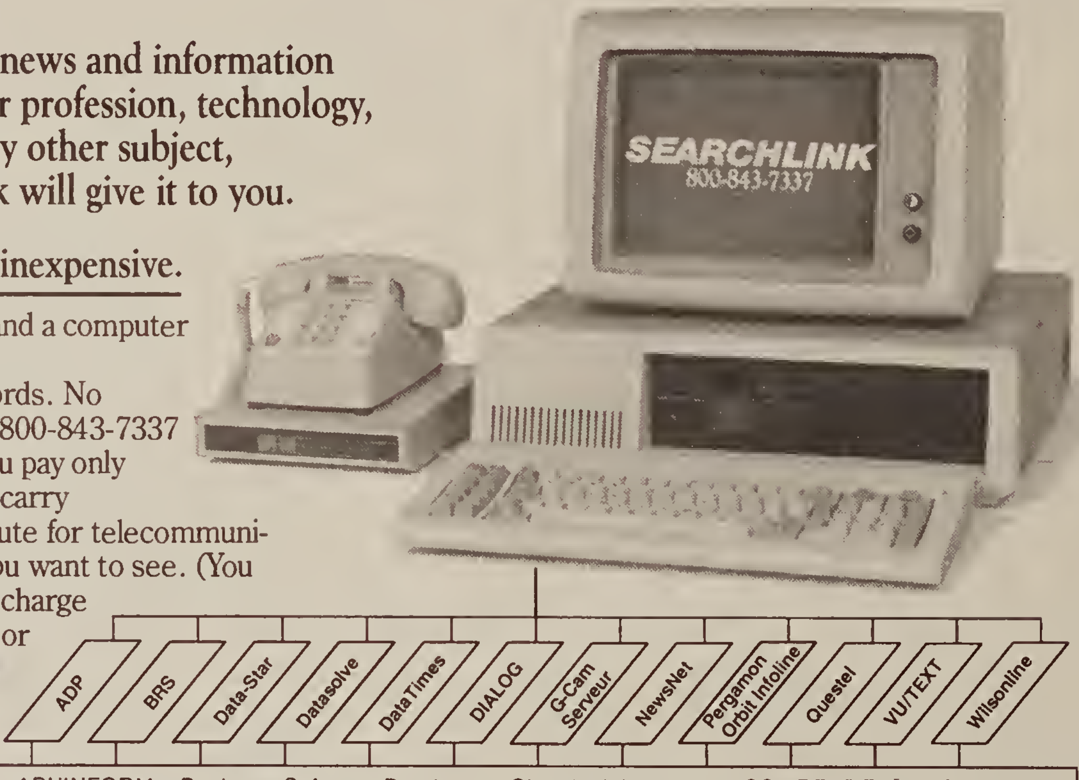

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CALENDAR

AUG. 9-15

Spocade III CAD/CAM Conference. Coeur d'Alene, Idaho, Aug. 9-11 — Contact: Spocad, E. 502 Boone Ave., Spokane, Wash. 99258.

Very High Performance Engineering Workstations. Bedford, Mass., Aug. 9-11 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

International Computers in Engineering Conference and Exhibition. New York, Aug. 9-13 — Contact: American Society of Mechanical Engineers, 345 E. 74th St., New York, N.Y. 10017.

2nd Annual Summer Camp for the Information Professional. Andover, Mass., Aug. 9-14 — Contact: Arnoudse & Ouellette Associates, Inc., #66, 40 S. River Road, Bedford, N.H. 03102.

Computer Art & Design Conference. Chicago, Aug. 10-14 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

RDB Frontiers '87. Boston, Aug. 10-14 — Contact: The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

Macworld Expo. Boston, Aug. 11-13 — Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

Third Annual Access Technology 20/20 Users' Group Meeting. Boston, Aug. 12-14 — Contact: Access Technology, Inc., 6 Pleasant St., Natick, Mass. 01760.

National Computer Graphics Association's Industry Roundtable. San Diego, Aug. 13 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

AUG. 16-22

The Tenth Annual McCormack & Dodge User Conference. Chicago, Aug. 16-20 — Contact: M&D, 1225 Worcester Road, Natick, Mass. 01760.

National Computer Graphics Association CAD/CAM '87 Conference and Exposition. Boston, Aug. 17-20 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

1987 International Conference on Parallel Processing. St. Charles, Ill., Aug. 17-21 — Contact: Department of Computer Science, University of Minnesota, 136 Lind Hall, Minneapolis, Minn. 55455.

Techdoc Eleven: Graphic Communications Association's Eleventh Annual Conference and Exhibition. San Francisco, Aug. 18-20 — Contact: GCA, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Information Forum for Local Government. Dallas, Aug. 19-20 — Contact: Infomart, Suite 6308, 1950 Stemmons Freeway, Dallas, Texas 75207.

AUG. 23-29

Image Scanning and Processing. Monterey, Calif., Aug. 23-25 — Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Provi-

Continued on page 58

McKesson

CONTINUED FROM PAGE 53

gives them in-depth training in how its business works.

The object of McKesson's training "is to instill in our technical managers the idea that they're in business to apply technology, not for its own sake, but to provide a customer service," Fitzgerald says.

As part of its management training procedures, McKesson routinely assigns prospective managers of its information systems personnel to pull at least brief stints on the help desk in its main data center here.

The desk is equipped with on-line personal computers and staffed with trained troubleshooters who field phone calls from customers and internal users in need of assistance with the company's systems, which include the Econoscan order-entry system for retailers.

Managers of McKesson's computing professionals are also expected to meet and talk with the end users who periodically visit the data center for guided tours. The interactions "help our systems managers understand what the people they are supposed to support are trying to do," Fitzgerald says.

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Continued from page 57

dence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Donna Skaggs, Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversary PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference On Very Large Data Bases. Brighton, England, September 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Denmark, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Publications, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Conference Administrator, Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research, Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511. Also being held Oct. 24-25 in Berkeley, Calif.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Linda Muzik, Attn: C421, National Computer Security Center, 9800 Savage Road, Fort George G. Meade, Md. 20755.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

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CONTINUED FROM PAGE 53

moted to vice-president for systems at **Survey Sampling, Inc.**, which supplies sampling data to the research industry.

Medlin, who had been director of systems since joining the company in 1984, will continue to manage its data base, software, systems, operations and quality-control groups. He will also become involved with the long-term planning and development of the department. Medlin was responsible for the company's upgrade from a Digital Equipment Corp. PDP-11/44 to a DEC clustered VAX-11/750 and a VAX 8300.

Coleman

Continental Illinois Corp. has announced the promotions of five employees to vice-president in its systems department.

They are: **Mitchell L. Claver**, a programmer in the Processor Support Division; **Lyanne E. Devine**, who manages software development for lending systems; **Stephen Gerth**, who manages a support program for internal software developers that provides operating areas with access to central computer information; **Melvin P. Hirsch**, who manages all of the corporation's international systems; and **L. Lee Lewis**, a project manager responsible for the acquisition and support of large computer systems.

Daniel Price has been promoted to an assistant manager in data services at the **Zurich Insurance Co.**'s U.S. branch, a member of the Zurich-American Insurance Group. Price joined Zurich-American in 1985 as a senior accounting analyst.

Previously, he had been a consultant for Deloitte Haskins & Sells. He graduated from the University of Illinois with a degree in accounting.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

Will M&D go on the block?

To some observers, Dun & Bradstreet Corp.'s recent sale of its Nomad line of fourth-generation language productivity tools was another indication that the $3 billion-plus conglomerate is losing its enthusiasm for the software products business.

Adherents of this analysis point to Dun & Bradstreet's acquisition of A. C. Nielsen Co. a couple of years ago as the watershed event in the firm's transformation into a broad-based provider of information and market research services.

The Nomad sale caused some observers to wonder whether the firm's remaining software products operation, McCormack & Dodge Corp., is a strategic fit — and some have speculated that M&D may eventually be sold.

To others, the disposal of Nomad to Thomson SA of France for roughly $17 million represented the sale of a technology that was late to market, had not captured a significant customer base and did not attain corporate revenue and profit goals. The sale of Nomad, proponents of this view say, had nothing to do with a corporate strategy of withdrawing from the software business, but rather, it was a classic economic decision.

Software still strategic

One thing is certain: Dun & Bradstreet has a tactical interest in software. Technology that helps Dun & Bradstreet enhance the delivery of its information and market research services is more than likely to continue to find its way into the conglomerate's hands.

But future Dun & Bradstreet acquisitions of companies that make their living selling software — be it applications or systems — seem out of the question. And Dun & Bradstreet's public statements do little to convince observers otherwise.

Bob Weissman, Dun & Brad-

Continued on page 62

Bridge, 3Com come out ahead

Analysts say LAN firms' proposed merger will boost users' migration paths

BY PATRICIA KEEFE
CW STAFF

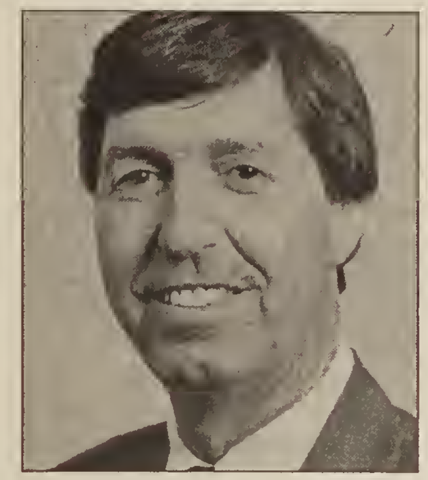
ANALYSIS

The proposed $193 million merger of network vendors 3Com Corp. and Bridge Communications, Inc. will greatly expand the migration paths available to their separate customer bases, according to local-area network (LAN) market analysts.

3Com customers will benefit from Bridge's superior support capabilities, high-end networking products and interconnectivity into Digital Equipment Corp., AT&T Unix and Transmission Control Protocol/Internet Protocol environments, analysts said. In turn, Bridge will benefit from access to 3Com's 3+ network software, distribution channels and microcomputer LAN products, especially with terminal sales dropping.

"Bridge said it will try to incorporate 3+ into its network management software," said Douglas Whitman, a network analyst with Alex Brown & Sons, Inc. in San Francisco. "That's a key area," agreed 3Com Chairman Robert Metcalfe.

Ten days ago, LAN vendor 3Com, based in Santa Clara, Calif., and its OEM customer Bridge, located in Mountain View, Calif., announced a definitive agreement to merge in a tax-free swap of stock. Metcalfe said the two firms have discussed merger possibilities "off and on" for years.



3Com President Krause

3Com agreed to exchange 1.4 shares of its common stock for each of Bridge's outstanding 8.3 million shares, making the transaction worth about $193 million at current stock market valuation. The merged company is expected to have sales of $200 million in 1988, 1,000 employees and about $81 million in cash. Stockholders will vote on the merger in October.

Teeming with teamings

Communications mergers rage as vendors seek connectivity focus. Page 60.

Analysts have rallied around the prospective combined companies, which will continue operations under the 3Com name, although Bridge will operate initially as a separate subsidiary under Judith Estrin. Estrin, an executive vice-president at Bridge, will become a senior vice-president at 3Com. Estrin is married to Bridge President William Carrico and is a former student of 3Com Chairman Metcalfe.

Better position

The merger is being lauded by some as a joining of two profitable, high-growth firms with complementary product lines. The combined company is expected to be in a better position to challenge Ungermann-Bass, Inc., DEC and Sun Microsystems, Inc.

The buy-out of Bridge is 3Com's first acquisition since announcing its intent last month to pursue a strategy of purchases and strategic alliances.

3Com intends to introduce 10 products in 1988 and to more aggressively court corporate accounts. Bridge sells primarily into the Fortune 1,000 as well as large government and university sites.

Still, the pending buy-out caught many by surprise. As recently as a few months ago,

Continued on page 63

Storage Tech ends Chapter 11

BY JULIE PITTA
CW STAFF

LOUISVILLE, Colo. — Nearly three years after its filing, the industry's most celebrated case of protection under Chapter 11 of the Federal Bankruptcy Code came to an end last week.

Mainframe disk drive maker Storage Technology Corp. last week officially began the process of distributing the combination of cash, notes and stock that it agreed to repay its creditors, a spokeswoman said. The U.S. Bankruptcy Court approved Storage Technology's reorganization plan in June.

Under the plan, the company will pay back its estimated $800 million debt with $132.5 million in cash, $285 million in 10-year notes and the issuance of 192 million shares of common stock.

Storage Technology began to

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Inside

- Former Wang exec joins Dataproducts. Page 60.
- Ungermann-Bass sales climb 59%. Page 60.
- Computer crime case revived. Page 63.

Data View

1987 second-quarter earnings

Most vendors are strong, but Storage Technology and Infotron post declines

Company	*Net income April-June (millions of dollars)*	*Percent change from 1986*	*Revenue April-June (millions of dollars)*	*Percent change from 1986*
Alliant Computer Systems Corp.	$1.7	+144	$13.3	+125
Britton Lee, Inc.[1]	($4.2)	—	$5.3	-28
Comdisco, Inc.	$25.4	+29	$271.4	+9
Convergent Technologies, Inc.[2]	$0.13	—	$104.7	+18
Excelan, Inc.	$0.97	+79	$8.4	+55
Informix Corp.	$1.1	+157	$9.1	+98
Infotron Systems Corp.	$0.16	-81	$20.5	-5
Mentor Graphics Corp.	$4.7	+108	$53.9	+28
Network Equipment Technologies Corp.	$2.9	+729	$17.3	+158
Sequent Computer Systems, Inc.	$1.2	+103	$9.1	+81
Storage Technology Corp.	$8.8	-36	$95.9	+16

Parentheses indicate loss

[1] Reported loss of $262,000 in 1986

[2] Reported loss of $11 million in 1986

CW CHART

Sun finishes scorching year, passes $500M milestone

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. reported one of its strongest quarters to date last week and finished its fiscal year with more than $500 million in revenue.

In the fourth quarter ended June 30, Sun posted net income of $10.9 million, or 31 cents per share, up 98% from $5.5 million, or 19 cents per share, from the same quarter a year earlier.

Revenue for the fourth quarter was up 142% to $185.9 million from revenue of $76.7 million last year.

Sun closed the books on fiscal 1987 with revenue of $537.5 million, a 156% increase over the $210.1 million reported for fiscal 1986. Net income tripled, from 1986's $11.2 million, or 42 cents per share, to $36.3 million, or $1.11 per share.

Fourth-quarter revenue exceeded the expectations of both Sun and Wall Street analysts. "Their sales have been very impressive and were far ahead of everyone's expectations," said Peter Rogers, an analyst with Mabon, Nugent & Co., an investment consulting firm in New York. "The workstation market is growing only at one-third of Sun's pace, and Sun is about $50 million in revenue ahead of their nearest competitor, Apollo Computer, Inc.," he added.

Rogers said Sun's profit margins were slightly lower than anticipated, however, as a result of recent reductions in retail prices, the introduction of a new reduced instruction set computing-based system and increases

Continued on page 60

Mergers target connectivity

Recent focus fuels marriages of 3Com-Bridge, Tandem-NAS

An industrywide focus on connectivity has fueled a rash of strategic alliances and mergers in data communications during the past two years, as vendors strive to position themselves as providers of communications capabilities.

The ideal marriage is one between partners of equal and complementary strengths that combine to expand their impact on the market, said Richard Kimball, an analyst with Montgomery Securities in San Francisco. A good example is the recent announcement by 3Com Corp. in Santa Clara, Calif., and Bridge Communications, Inc. in Mountain View, Calif., of their intent to merge. 3Com will provide Bridge with personal computer networking while gaining gateways into larger networks (see story page 59).

Two CPU hardware vendors, Tandem Computers, Inc. and National Advanced Systems Corp. (NAS), recently jumped on the connectivity bandwagon by announcing strategic relationships designed to broaden their offerings.

Tandem branches out

Cupertino, Calif.-based Tandem leads the way with two investments: a minority interest in Netlink, Inc., a privately held developer of enhanced IBM Systems Network Architecture (SNA) hardware and software located in Raleigh, N.C.; and GTE Corp. subsidiary General Telephone Co. of the Northwest, Inc. in Everett, Wash.

Netlink and Tandem have agreed to jointly develop and market products to enhance integration between Tandem's Nonstop systems and IBM systems through the use of Netlink's SNA products.

"Our products will operate with Tandem systems serving as processors of transactions in distributed, often heterogeneous networks," said Paul Wood, Netlink's chief executive officer.

Tandem's pact with GTE-Northwest involves integrating each company's products into a comprehensive offering for the management of telecommunications within large organizations. Tandem said it plans to evaluate GTE-Northwest's Network Management Control Center system as a possible product for joint marketing.

Focus on turnkey products

Joint development of turnkey connectivity products is the goal behind a five-year agreement between NAS, a subsidiary of National Semiconductor Corp., and gateway vendor Interlink Computer Sciences, Inc., based in Fremont, Calif. NAS has taken a minority position in privately held Interlink, gaining the right to develop, design, market, lease or sell products based on Interlink technology for installation on NAS systems.

NAS sells Hitachi Ltd. mainframes on an OEM basis and has developed a product incorporating Interlink's software, which links Hitachi mainframes to Digital Equipment Corp. systems. Interlink's software links DEC and IBM MVS and VM systems and is ported to DEC PDP-11s and VAXs, which function as black boxes.

Separately, Counterpoint Computers, Inc. in San Jose, Calif., a manufacturer of multiuser workstations, and Italtel Societa Italiana Telecommunicazioni, Italy's largest manufacturer of telecommunications equipment, formed a strategic alliance to spur integration of their data communications and telecommunications products.

The alliance involves an OEM contract, joint product development and a future equity investment. Under the OEM contract, the state-owned Italtel will purchase $5 million to $10 million in Counterpoint equipment during the next three years.

PATRICIA KEEFE

INDUSTRY NOTES

IBM promotes three executives

IBM announced three promotions last week.

David E. McKinney, former vice-president of communications, was named senior vice-president and chief of IBM's corporate operations staff. McKinney was formerly president of the IBM World Trade Americas/Far East Corp.

John P. Cunningham Jr., formerly assistant group executive for plans and controls in IBM's Information Systems Technology Group, was named a vice-president.

Robert N. Mattson, IBM's former director of taxes, was named assistant treasurer for the firm.

Robert L. Doretti, the former head of U.S. operations for Wang Laboratories, Inc. who recently resigned from that company, was appointed executive vice-president of sales and marketing for **Dataproducts Corp.** last week. Dataproducts is a 25-year-old printer manufacturer that is based in Woodland Hills, Calif.

Computer Sciences Corp. (CSC) is protesting the State of California's award to **Electronic Data Systems Corp.** of a $122 million five-year contract to process claims in the state's medical insurance program.

"It was our determination that they were not a responsible bidder, based on their price structure and past performance," said Stan Rosenstein, project manager for the state's Medical procurement project.

El Segundo, Calif.-based CSC has processed claims in California since 1978. "We are nonplussed by the whole development," said Arthur B. Sims, president of CSC's Industry Services Group.

Separately, CSC reported that its profits for the first quarter ended July 3 grew by 42% from the like quarter last year. This year's first-quarter profits were $9.5 million, or 59 cents per share, on revenue that increased 17% to $274.6 million.

Maxtor Corp. in San Jose, Calif., recently announced the appointment of **George M. Scalise** as president and chief executive officer, replacing **James M. McCoy**, who will remain in his capacity as chairman of the board.

Scalise, 53, was formerly senior vice-president at Advanced Micro Devices, Inc. in Sunnyvale, Calif., where he most recently was involved in Japanese trade agreements. Scalise's strengths are said to be in marketing, manufacturing and finance, and he has served on Maxtor's board of directors for the past year.

McCoy, 40, a Maxtor founder, said it was his intention all along to "build a team that I could turn the management of the company over to." His focus reportedly will be on the company's strategic direction and planning.

Former disk drive maker **Computer Memories, Inc.** recently announced its intent to establish a $15.5 million settlement fund to compensate the plaintiffs in a 1984 shareholder suit. The fund will consist of stock and cash, of which $7 million will be paid by the company's directors' and officers' insurer.

Initially filed in September 1984, the suit alleged misstatements and omissions in an August 1983 stock offering prospectus. Plaintiffs sought $50 million in damages.

Chatsworth, Calif.-based Computer Memories was a promising drive maker until August 1985, when IBM opted not to renew the firm's contract as an OEM of hard disk drives. The loss of the IBM account and a resultant $18 million loss for that year drove Computer Memories out of the disk drive business in July 1986.

General Electric Co.'s **GE Information Services** division last week announced an agreement for the marketing of its network-based teleprocessing services by **ISI-Dentsu** to Japanese companies operating in the U.S.

ISI-Dentsu has formed a wholly owned subsidiary corporation called ISI-Dentsu of America, to be based in the U.S.

ISI-Dentsu has been a distributor in Japan of GE Information Services' teleprocessing services since 1971.

Under severe financial pressure caused by a lack of equity financing and a patent infringement lawsuit, **Lattice Semiconductor Corp.** in Beaverton, Ore., recently filed a voluntary petition for protection under Chapter 11 of the Federal Bankruptcy Code.

Lattice is struggling to shake its two-year losing streak, in which a $10 million equity placement fell through, payrolls went unpaid, bills mounted and top management was fired.

Matters grew worse as a result of a patent infringement lawsuit filed last fall against Lattice by **Monolithic Memories, Inc.**, which intimidated potential venture capital investors from coming to the former's rescue.

NICKELS & DIMES

Ungermann-Bass, Inc. earned $1.2 million, or 7 cents per share, for the second quarter ended July 4, compared with a loss of $3.9 million, or 23 cents per share, in the second quarter of 1986. Sales rose 59% to $36.2 million from $22.7 million a year earlier.

IPL Systems, Inc. announced revenue for its second quarter ended June 27 of $1.15 million, compared with $564,000 last year. Profits were $383,000, or 8 cents per share, vs. $207,000, or 4 cents a share, for the like quarter in 1986.

Contel Corp. reported revenue for the second quarter ended June 30 of $745.6 million, compared with $775.4 million for the previous year. Net profits were $46.9 million, or 61 cents per share, down from $56.9 million, or 74 cents per share, last year.

Dataproducts Corp. announced revenue for the quarter ended June 27 of $77.4 million, compared with $84.4 million in the like period a year earlier. Income was $335,000, or 2 cents per share, down from $2.5 million, or 12 cents per share, last year.

Bridge Communications, Inc. reported revenue for its second quarter ended July 4 of $17.1 million, up 68% from the like period in fiscal 1986. Net income was $1.8 million, or 21 cents per share, up from $1 million, or 13 cents per share, reported for the like quarter last year.

Cypress Semiconductor Corp. reported revenue for the second quarter ended June 29 of $17 million, compared with $11 million last year. Net income was $3.5 million, or 9 cents per share, compared with $3.3 million, or 12 cents per share, last year.

Pyramid Technology, Inc. reported revenue for its third quarter of $13.7 million, compared with $10 million in the like quarter last year. Profits were $801,000, or 9 cents a share, compared with a loss of $2.1 million, or 27 cents a share, in the third quarter of 1986.

Sun

FROM PAGE 59

in research and development funding.

"Sun has been investing aggressively," said Scott McNealy, president and chief executive officer, in a prepared statement.

"We have entered a period of new product introductions unprecedented in Sun's history. We recently began manufacturing in a 156,000-sq-ft facility, and we are in the midst of a major expansion of our worldwide sales and support organizations," McNealy said.

Sun will spend 13% to 14% of its revenue during fiscal 1988 for developing products and enhancements, he added. The average annual industry research and development investment is about 8%.

Analysts said they expect Sun's fiscal 1988 sales to grow by 50% to 75%, while the workstation market should expand by 40% to 50%. Sun's sales will be spurred by an increased market as a result of lower prices, a strong product line and increased manufacturing capabilities, analysts said.

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1. **Industry** (check one only)

Non-computer related businesses

- ☐ **1.** Aerospace
- ☐ **2.** Agriculture, mining, construction, oil
- ☐ **3.** Business consulting (non-computer related)
- ☐ **4.** College/university
- ☐ **5.** Elementary/high school
- ☐ **6.** Engineering/architecture
- ☐ **7.** Finance, banking, accounting, insurance, real estate
- ☐ **8.** Government
- ☐ **9.** Health/medical services
- ☐ **10.** Legal services
- ☐ **11.** Manufacturing
- ☐ **12.** Military
- ☐ **13.** Other business services
- ☐ **14.** Publishing/advertising/public relations
- ☐ **15.** Research & development
- ☐ **16.** Retail/wholesale
- ☐ **17.** Transportation, communications, utilities
- ☐ **98.** Other (please specify) ____________________

Computer-related businesses

- ☐ **18.** Computer consultants
- ☐ **19.** Computer retail
- ☐ **20.** Distributor/wholesalers
- ☐ **21.** Manufacturer (computers, software, peripherals)
- ☐ **22.** Service bureau
- ☐ **23.** VAR/systems house/integrator
- ☐ **99.** Other (please specify) ____________________

2. **Title** (check only one)

- ☐ **A.** Chairman/president/owner/partner
- ☐ **B.** Vice president
- ☐ **C.** Controller/treasurer/accountant
- ☐ **D.** Director/supervisor/manager
- ☐ **E.** Project manager/chief/group leader
- ☐ **F.** Art director/writer/creative head/technical writer
- ☐ **G.** Engineer/scientist
- ☐ **H.** Administrator
- ☐ **I.** Consultant/advisor
- ☐ **J.** Microcomputer specialist/manager/analyst
- ☐ **K.** Programmer
- ☐ **L.** Educator
- ☐ **M.** Professional (lawyer, doctor, etc.)
- ☐ **Z.** Other (please specify) ____________________

3. **Department or function** (check only one)

- ☐ **A.** Accounting/finance
- ☐ **B.** Administration/management/personnel
- ☐ **C.** Consulting
- ☐ **D.** Education/training
- ☐ **E.** Engineering/R&D
- ☐ **F.** Manufacturing/production
- ☐ **G.** Microcomputer center/office automation
- ☐ **H.** MIS/DP
- ☐ **I.** Purchasing
- ☐ **J.** Sales/marketing/distribution
- ☐ **Z.** Other (please specify) ____________________

4a. **Does your company own or lease any mainframe computers at this location?** ☐ Yes ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ **1.** IBM		
☐ **99.** Other (specify)		

4b. **Does your company own or lease any minicomputers at this location?** ☐ Yes ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ **1.** IBM		
☐ **2.** DEC		
☐ **3.** Sun/Apollo		
☐ **99.** Other (specify)		

5. **Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?** ☐ **Yes** (indicate quantity below) ☐ **No**

Manufacturer	Currently own (quantity)	Plan to buy within 1-12mos	13-24mos
☐ **1.** Macintosh 128/512			
☐ **2.** Macintosh Plus			
☐ **3.** Macintosh SE			
☐ **4.** Macintosh II			
☐ **5.** Apple IIe/IIc/IIGS			
☐ **6.** IBM Compatible (Compaq, Tandy, etc.)			
☐ **7.** IBM PC/XT/AT/RT			
☐ **8.** IBM Personal System/2			
☐ **9.** Sun/Apollo workstation			
☐ **99.** Other scientific or engineering workstations (non-mini)			

6a. **Please indicate your involvement with each of the following types of personal computers or microcomputer systems** (check all that apply)

	Macintosh	Micros	Software	Networks & Peripherals
☐ **1.** Approve purchase				
☐ **2.** Develop/manufacture				
☐ **3.** Evaluate/select vendor				
☐ **4.** Own (at least one)				
☐ **5.** Own (two or more)				
☐ **6.** Purchase or acquire				
☐ **7.** Establish specifications				
☐ **8.** Recommend to others				
☐ **9.** Sell				
☐ **10.** Train people to use/or provide support				
☐ **11.** Use				
☐ **12.** No involvement				
☐ **99.** Other (please describe by name and quantity)				

If you have no involvement with any of the above, skip to question 8.

6b. **For approximately how many total personal computers or microcomputer systems do you have the above involvement?** (check only one)

☐ **A.** 1-3 ☐ **C.** 10-19 ☐ **E.** 50-99 ☐ **G.** 500+
☐ **B.** 4-9 ☐ **D.** 20-49 ☐ **F.** 100-499

7. **For approximately how many Macintosh personal computers do you have involvement described in question 6 above?** (check only one)

☐ **A.** 1-3 ☐ **C.** 10-19 ☐ **E.** 50-99 ☐ **G.** 500+
☐ **B.** 4-9 ☐ **D.** 20-49 ☐ **F.** 100-499

8a. **How many people work at your location?** (check only one)

☐ **A.** 1-9 ☐ **D.** 100-499 ☐ **G.** 2500-4999
☐ **B.** 10-24 ☐ **E.** 500-999 ☐ **H.** 5000-9999
☐ **C.** 25-99 ☐ **F.** 1000-2499 ☐ **I.** 10,000 or more

8b. **How many people are employed by your entire company?** (check only one)

☐ **A.** 1-9 ☐ **D.** 100-499 ☐ **G.** 2500-4999
☐ **B.** 10-24 ☐ **E.** 500-999 ☐ **H.** 5000-9999
☐ **C.** 25-99 ☐ **F.** 1000-2499 ☐ **I.** 10,000 or more

9. **What percentage of people who work at your location actually use a personal computer?** (check only one)

☐ **A.** 1-24% ☐ **C.** 50%-74% ☐ **E.** None
☐ **B.** 25%-49% ☐ **D.** 75%-100%

10. **The personal computer purchased for this location would be** (check all that apply)

☐ **A.** for internal use ☐ **B.** for resale
☐ **Z.** Other (please specify) ____________________

11. **How are personal computers normally obtained for this location?** (check all that apply)

- ☐ **A.** direct from manufacturer
- ☐ **B.** manufacturer's representative
- ☐ **C.** distributor or wholesaler
- ☐ **D.** retail computer store
- ☐ **E.** mail order
- ☐ **F.** VAR/systems house
- ☐ **G.** In-house (company or university store)
- ☐ **Z.** Other (please specify) ____________________

12. **Personal computers or microcomputer systems at your location are or soon will be used for the following communications activities** (check all that apply)

- ☐ **A.** Communicate with internal company mainframe or mini
- ☐ **B.** Communicate with other micros via modem
- ☐ **C.** Communicate with outside mainframe or mini through service bureau, database or time-sharing service
- ☐ **D.** Local area network
- ☐ **E.** Voice/data
- ☐ **F.** None of the above
- ☐ **Z.** Other (please specify) ____________________

13. **Are you involved in any of the areas shown below?**

☐ **Yes** (check all that apply) ☐ **No**
☐ **A.** Recommend ☐ **C.** Specify
☐ B. Influence ☐ **D.** Buy
(check all that define your involvement)

Software

- ☐ **1.** spreadsheets
- ☐ **2.** word processors/outline processors
- ☐ **3.** database management
- ☐ **4.** accounting
- ☐ **5.** statistics
- ☐ **6.** communications/networking
- ☐ **7.** graphics
- ☐ **8.** presentation
- ☐ **9.** project management
- ☐ **10.** desktop publishing
- ☐ **11.** CAD/CAM
- ☐ **12.** programming language
- ☐ **13.** back-up systems
- ☐ **14.** utilities
- ☐ **15.** other ____________

Peripherals

- ☐ **24.** dot matrix printers
- ☐ **25.** letter quality printers
- ☐ **26.** plotter
- ☐ **27.** laser printer
- ☐ **28.** local area network
- ☐ **29.** file server
- ☐ **30.** optical disk
- ☐ **31.** monochrome monitor
- ☐ **32.** color monitor (standard)
- ☐ **33.** hi-res color monitor
- ☐ **34.** add-on board
- ☐ **35.** external hard disk
- ☐ **36.** internal hard disk
- ☐ **37.** back-up systems
- ☐ **38.** modem
- ☐ **39.** other ____________

Computers

- ☐ **16.** personal computers
- ☐ **17.** multiuser microcomputers
- ☐ **18.** laptop microcomputers
- ☐ **19.** portable microcomputers
- ☐ **20.** engineering workstation
- ☐ **21.** minicomputers
- ☐ **22.** mainframe computers
- ☐ **23.** others ____________

Outside Services

- ☐ **40.** on-line services
- ☐ **41.** education/training
- ☐ **42.** maintenance
- ☐ **43.** custom application
- ☐ **44.** service bureau
- ☐ **45.** other ____________

14. **Over the course of one year, how would you quantify your level of involvement in total microcomputer systems products?**

☐ **A.** Recommend ☐ **C.** Specify
☐ **B.** Influence ☐ **D.** Buy
(please check all that define your involvement)

- ☐ **1.** less than $10,000
- ☐ **2.** $10,000-$24,999
- ☐ **3.** $25,000-$49,999
- ☐ **4.** $50,000-$99,999
- ☐ **5.** $100,000-$249,999
- ☐ **6.** $250,000-$499,999
- ☐ **7.** $500,000+
- ☐ **8.** None of the above

(check only one)

5AAD4

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M&D on block?

CONTINUED FROM PAGE 59

street's president and chief operating officer, says he can't address the issue of the firm's software business strategy because the term "software" is not meaningful to his company. "To say you're in software is almost like saying you're in manufacturing," Weissman says. "The question is: What are you a manufacturer of?"

To make assumptions based on the sale of Nomad is, therefore, meaningless, Weissman stresses. Nomad, orginally a time-sharing system, got a late start in the market and never caught up with fourth-generation language market leaders Focus and Ramis, which are marketed by Information Builders, Inc. and On-Line Software International, Inc., respectively. Rather than reinvest in a maturing technology, Dun & Bradstreet decided to sell Nomad and invest the proceeds in its other businesses, Weissman says.

In contrast, Weissman says he sees opportunity for M&D. The $120 million Natick, Mass., firm is meeting its corporate financial goals, he says, noting that revenue grew by 30% last year.

Weissman disputes some analysts' assessments that M&D has not lived up to its parent company's lofty goal of overtaking Management Science America, Inc. (MSA) on a revenue basis. To look solely at MSA's revenue growth is unfair, he claims, because much of that increase has been achieved through acquisition and diversification into different application software segments.

"If you compare apples to apples, you'll find M&D gained market share substantially on MSA," he says. M&D "is a profitable business that is growing faster than the corporation on the whole."

Still, some analysts are unconvinced that M&D will remain with Dun & Bradstreet for the long haul. "I can't see, from a logical view, where it [M&D] fits. It just doesn't make any sense," says Tom Lawton, publisher of "The Computer Services Report," which is based in Belmont, Mass. "Maybe they're trying to get the earnings up so that it will make more money for them when they make the sale."

Besides subsidiaries Erisco and M&D, Dun & Bradstreet owns 40% of TSI International, Ltd., a Norwalk, Conn., on-line data entry software vendor that formerly operated as a wholly owned subsidiary. Interestingly, TSI has gone from a nonentity to a successful niche-oriented company since leaving the Dun & Bradstreet corporate fold.

Dun & Bradstreet's experience with Nomad and TSI may have taught the firm that it cannot effectively own, manage and effect the direction of small software operations. Dun & Bradstreet is making more money as a TSI shareholder than it did as an owner, notes Ernest Keet, president of Vanguard Atlantic Ltd., the investment and merchant banking firm that led the leveraged buy-out of TSI.

Keet was the Dun & Bradstreet software executive who arranged the purchase of M&D. He says he expects Dun & Bradstreet to continue investing in software technology that is synergistic with the rest of its businesses. "There was a software strategy when I was there, and I'm sure there still is one," Keet says.

But Dun & Bradstreet's Weissman remains noncommittal, leaving the door open for speculation as to just what his company's corporate goals are in the software business. "We're expanding where we've already been," Weissman says, "rather than going in a different direction."

Alper is *Computerworld*'s Mid-Atlantic bureau correspondent.

Storage Tech

CONTINUED FROM PAGE 59

stumble in 1983, the year in which it filed for protection from its creditors. Industry observers blamed the company's difficulties on a loss of focus. When Storage Technology filed for reorganization in 1984, it was the largest computer company to ever enter Chapter 11 protection.

"They ran in too many directions at once," said Robert Katzive, disk drive industry analyst for Disk/Trend, Inc., a Mountain View, Calif., market research firm.

"They got into the mainframe processor business — that was a disaster. They were developing a high-performance optical drive that they didn't have the resources to carry through. Once they stopped those activities, things started looking up," Katzive said. "They've gone back to doing what they do best."

Today, the company has four product lines that center around IBM-compatible disk and tape drives as well as a line of high-speed impact printers. Since filing for Chapter 11 protection, the company has slashed its work force from a peak of 16,000 to 8,500.

Additionally, the company has returned to the black, reporting earnings of $36.2 million on revenue of $696 million in 1986. In its most recent quarter, ended June 30, Storage Technology remained profitable, although earnings fell 36% from year-earlier levels to $8.8 million, or 4 cents per share. Quarterly revenue was up 16% to $95.9 million.

Storage Technology's reorganization was engineered by Ryal Poppa, appointed as chairman and chief executive in early 1985 to replace founder Jesse Aweida.

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Computer crime case revived

BY JEFFRY BEELER
CW STAFF

LOS ANGELES — In what appears to be an unprecedented computer crime case pending here, a computing services provider is battling charges that it altered its own system in an apparent attempt to frustrate a troublesome client.

The Los Angeles County District Attorney's Office has requested a hearing before the California Supreme Court to revive a case against BHI, Inc. for allegedly preventing Downey Schools Federal Credit Union from gaining access to financial data the credit union had stored in the computing services firm's system.

In a complaint that was originally filed in Los Angeles Municipal Court, BHI was accused of violating the state's computer crime law by deliberately changing the credit union's passwords without the customer's consent.

The decision to issue new passwords climaxed an already bitter contractual dispute between the two parties, according to Deputy District Attorney Steve Plafker.

Trial remains uncertain

But whether the matter will ever go to trial remains highly debatable. In May, an appellate court judge overturned a lower court's refusal to dismiss the case.

In granting the defense's earlier motion for dismissal, the Court of Appeals voiced serious doubts about whether the California legislature ever intended the state's computer crime law to apply to conduct such as BHI's.

Although the password changes were apparently calculated to "inconvenience, annoy and vex" the credit union, the computing services company's actions fell short of constituting a criminal offense, according to the court.

'Intriguing matter'

"No court in California has ever faced a case quite like this one," said BHI legal counsel Ed George, a private practitioner in Long Beach, Calif. "It's an intriguing matter and is being written up in all the legal books because of the novelty of the issues it raises."

California's penal code already outlaws unauthorized systems accesses by corporate employees and external intruders such as teenage hackers.

However, existing statutes fail to address the question that lies at the heart of the BHI case: Does the malicious use of systems resources qualify as a crime if the offender is also the hardware's owner?

Tracing roots

Filed in February 1985, the case traces its roots back to Downey Schools' decision to replace BHI with an alternative computing services supplier.

When efforts by the two sides to negotiate an interim services contract collapsed, one of the defendant's principals, Leslie Richard Mahru, reportedly instructed a subordinate to change the credit union's passwords without prior notification.

BHI counsel George defended the action. "They were merely trying to protect the integrity of the system so that if the credit union later brought in people who didn't know much about computers, they wouldn't screw up its data base," George said.

Whatever the motivation behind BHI's actions, the sudden issuance of new passwords forced the credit union to hire an independent consultant, who worked for four days before he could restore the client's access to its files.

Bridge, 3Com

CONTINUED FROM PAGE 59

Bridge was holding similar talks with 3Com rival and LAN software vendor Novell, Inc. in Provo, Utah. However, talks broke off after three months.

Also, 3Com has been exceedingly unlucky in previous merger attempts, which have included Sytek, Inc., Convergent Technologies, Inc. and Centram Systems West, Inc. 3Com's investment bankers scuttled the Convergent marriage at the altar, while Centram jilted its suitor to elope with Sun, a large 3Com OEM.

Room for two at the top?

Despite a generally positive assessment of the merger, some analysts question whether there is room in the combined venture for both Bridge's Carrico and 3Com President William Krause. Krause will be chairman and chief executive officer with Carrico as president of the firm.

Others have questioned 3Com founder Metcalfe's status. He will no longer be chairman, but he will remain on the board and continue as a senior vice-president. Metcalfe characterizes the chairmanship as a ceremonial position, and he stressed in an interview last week that he is happy directing product development.

There are also potential distribution conflicts to be resolved. 3Com sells exclusively through resellers, but larger, complicated networks typically require some direct sales invovlement. There have already been problems with Bridge sales personnel and 3Com dealers calling on the same accounts, Metcalfe said.

In addition, it remains to be seen what role Bridge will play in 3Com's joint development of the OS/2 LAN Manager with Microsoft Corp. in Redmond, Wash.

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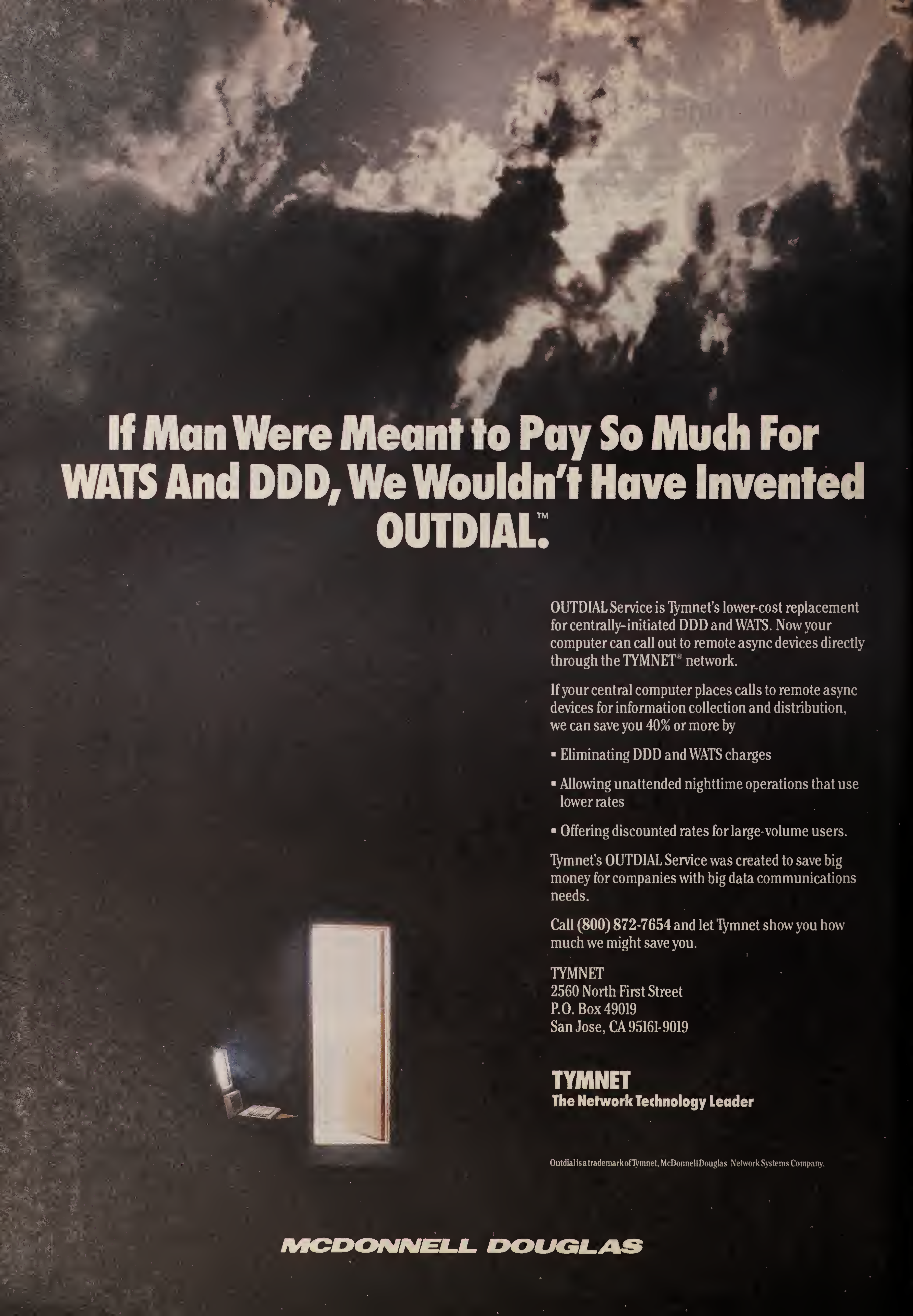

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EMPLOYMENT TODAY

Insurers stake claim on MIS

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BY DALE F. FARMER
SPECIAL TO CW

A rebirth of financial stability and employment growth is creating openings for MIS professionals in the insurance industry. Industry experts forecast growth of 15% to 25% for MIS personnel during the next two to five years.

Because of deregulated markets and high demand for new insurance services, opportunities for MIS are almost unlimited. "So far, the application of technology to sales and administrative services in insurance has just scratched the surface," says Dave Allen, executive vice-president at Lincoln National Corp. in Fort Wayne, Ind.

User acceptance of information technology in insurance is paving the way for new applications. Not too long ago, personal computers were used as standalone devices. Now, they are becoming integrated into the communications structure and allowing users to access mainframe data bases.

"We are reaching out to clients and to brokers who sell insurance," says Bill Skowyra, senior vice-president of MIS at Blue Cross/Blue Shield of Missouri in St. Louis. "We are now putting PCs in client offices so they can maintain their own files. This cuts costs for both Blue Cross and our clients."

Shopping for talent

Currently, insurance companies are seeking professionals with telecommunications experience, especially in the areas of local-area networks and micro-to-mainframe links. Large companies also want professionals with CICS experience to develop menu-driven mainframe applications. Programmers with advanced applications experience in data base management and artificial intelligence are also in demand.

Another crucial item on every employer's shopping list for MIS professionals is a good background in business and financial applications, preferably in insurance environments. "If you are a programmer with insurance applications experience, you could find a job in a lot of companies across the country," says John McFarland, data processing recruiter for Executive Life Insurance Co. in Los Angeles.

One way to gain this experience — other than working for an insurance company — is through trade associations, such as the Life Office Management Association. The group offers a series of certificate programs that provide experience and knowledge of different facets of the insurance industry.

While there are openings in many parts of the country, many of the best opportunities will be found in major financial districts, such as New York and Chicago, because of the large number of brokerage houses located there.

Insurance companies are also paying more for MIS expertise. In the past, these firms were considered training grounds that relied on poorly paid college students. This policy encouraged a high turnover rate. Currently, companies are offering higher salaries and better benefits to keep employees on the payroll longer.

> "FROM my point of view, it is a fascinating, challenging and exciting business. But you had better be good, because it will take very, very good people to do this work."
>
> DAVE ALLEN
> LINCOLN NATIONAL CORP.

"We have a staff of over 300, and our turnover rate is around one person per month. We are not cavalier about it, but we do have in-house training and are very selective in hiring. We accept only one out of every 27 applicants," Skowyra says.

According to figures supplied by Blue Cross/Blue Shield, a senior programmer/analyst can earn $26,000 to $40,000, while a systems programmer can make $29,000 to $44,000. Data base managers can take in $36,000 to $54,000, and MIS directors can earn from $54,000 to as much as $81,000.

But what are the real advantages of working in insurance? Because of constant changes in the marketplace, the DP operation provides many opportunities for creativity, McFarland says, "but the only problem is that there is a great deal of hard work and overtime required. If you are an eight-to-five programmer, an insurance industry shop is not for you."

Another attractive aspect of insurance operations is that companies are focusing on integrating information technology with the overall business. "The technology will be an integral part of the company," Allen says. "In many ways, we are starting at ground zero in these things. From my point of view, it is a fascinating, challenging and exciting business. But you had better be good, because it will take very, very good people to do this work."

In the future, insurance companies will be examining a wide variety of options that require employees with deep technical backgrounds. Programmers with experience in operating system internals will be in great demand.

Professionals with experience in imaging technology will also be sought. Some companies, such as Blue Cross/Blue Shield, are advancing themselves into an electronic-office complex. "We get 60% of our documents electronically," Skowyra says, "but for the other 40%, we need imaging, possibly using a teller machine. Current scanners are just too slow."

McFarland says that his company will need "lots of people with experience in CICS and telecommunications. There is a lot of opportunity because so many of our salespeople are online. We are also looking at video conferencing and point-of-sale terminals for the future."

The bottom line, Allen says, is that companies are looking for "innovative people. We need those who can walk on water and fly without wings. We need people who can do the work of three before breakfast. We just need the best."

Farmer is a security administrator for Financial Technologies, Inc. in Chantilly, Va.

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C9E3E840E2C5E5C5D9C1
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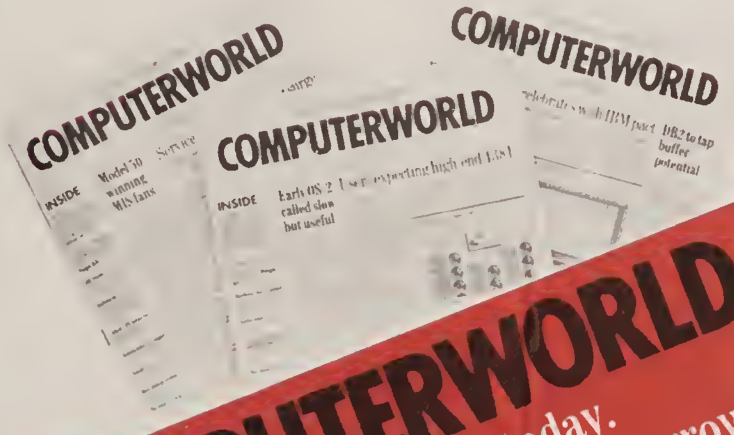

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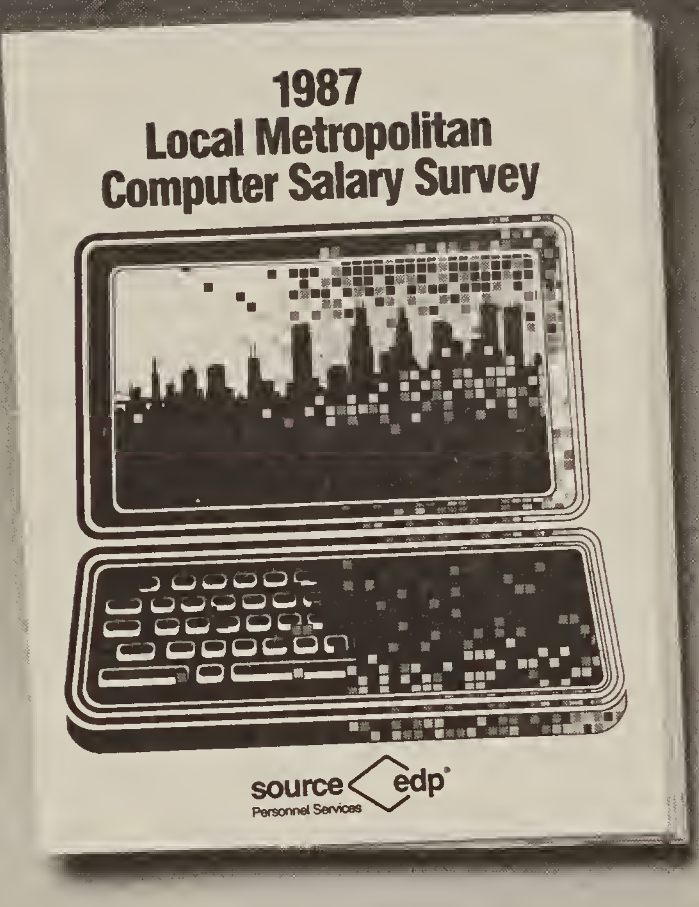

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Software Engineer - Analyze users production operations; design, develop implement and maintain management information systems; modify systems accordingly; write program specifications. Use Burroughs mainframe, DMSII, CANDE, WFL, GEMCOS, COBOL and Assembler. Bachelor's degree in Electronics and Communication Engineering or Computer Science. 2 years experience. 40 hours per week. $33,000 per year. Mail resume: NYS Job Service JO #8004403, 247 W. 54th St., 4th Fl. New York, NY 10019.

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Please call Dewey Raymond,
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Provide overall technical direction for Artificial Intelligence programs, including marketing support and managing development projects in expert systems and natural language applications. Requires an advanced technical degree as well as 6 plus years in A I software development.

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The Data Processing Unit of the Bermuda Government provides a data processing service to all Departments of the Government, using a central IBM System/38 computer plus distributed microcomputers where appropriate. Applications are now invited for the position of Operations Manager.

The postholder will be required to schedule and manage the activities of the Operations Department staff and establish and maintain job schedules. Other areas of responsibility will include interviewing and selection of new staff, maintenance of personnel records, training recommendations and review of staff performance.

The postholder will be expected to ensure physical security of the computer site, evaluate equipment performance, maintain records of machine usage, report on machine capacity, maintain adequate supplies of consumables, and recommend and implement operational procedures which will improve efficiency, control, and security.

In conjunction with systems and programming staff, he or she will ensure integrity of data files progress and operation procedures, including the review of new systems to ensure adherence to standards and the authorizing and scheduling of implementation of these systems. In addition there may be other administrative functions as required and defined by the Controller.

The successful applicant will have had a minimum of three (3) years experience in Data Processing at the Management/Supervisory level and should possess the equivalent of a United Kingdom Higher National Diploma/Certificate. Preference will be given to candidates with a University degree in a numerate discipline.

At present, there is no personal income tax in Bermuda but the cost of living is high. Total non-refundable statutory deductions will amount to some 5% of gross salary. The cost of renting furnished accommodation could amount to 25% of gross salary and a housing subsidy may be payable. Return passage, baggage and settlement allowances will be provided. An employment contract for a period of three years service will be offered to the successful applicant.

Applications must provide full details of employment, academic and professional qualifications, relevant experience, personal information for immigration purposes, and the names of four referees (two professional, two character) and telephone numbers for confidential contact. Applications should be forwarded by air mail to the Secretary to the Public Service Commission, Global House, 43 Church Street, Hamilton HM12, BERMUDA to arrive not later than the 24th, August, 1987

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Responsibilities: Manages the support program for research computing and the associated support personnel (3 PR-2 professionals) of the SUNY-Binghamton Computer Center Academic Support Group. Consults with faculty to estimate computer resources (hardware, software and dollars) needed for research projects. Coordinates documentation and consulting for users of the IBM 3090/180VF, the Cornell Theory Center, and the various external networks accessed by researchers; coordinates documentation and access to databases maintained for research purposes. Maintains awareness of available advanced workstations and data acquisition products.

Requirements: M.S. in Computer Science, Electrical Engineering or related discipline and 3-5 years of scientific programming experience. Some realtime data acquisition/control experience and one or more years' experience as a software development team leader is also preferred.

Candidates selected for interview may be asked to present a seminar on a topic related to scientific or laboratory computing.

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Job Order No.0608260, D.O.T. 020.187.014. Report to: N.Y. State Job Service, 1510 Fifth Ave., Bay Shore, N.Y. 11706 or Job Service, closest to your home. Bring 3 copies of resume.

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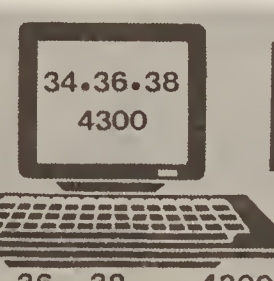

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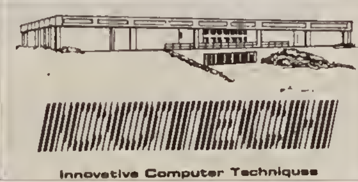

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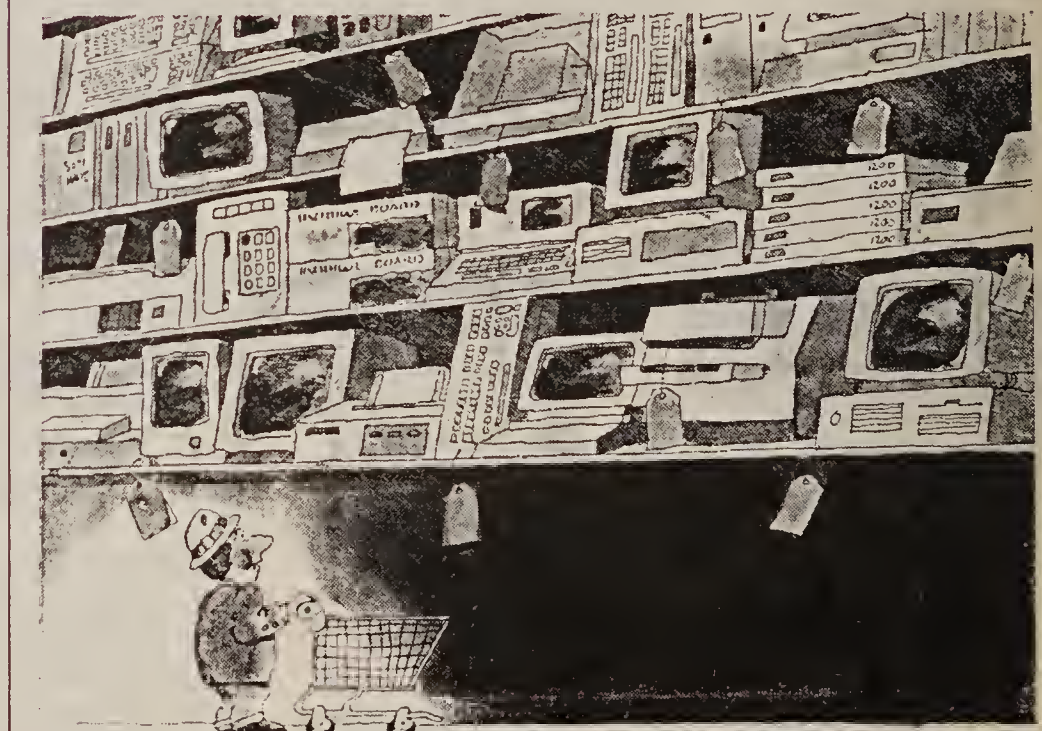

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Sept. 14	DB2 Market	Aug. 28
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Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
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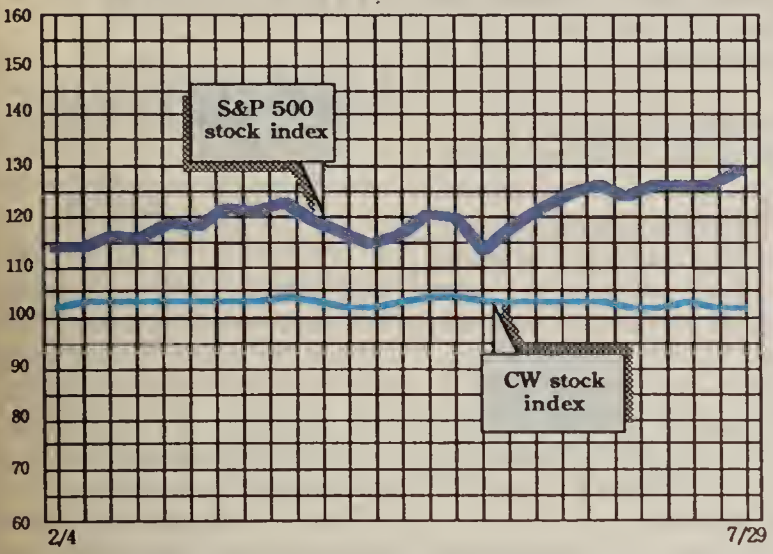

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Communications	100.5	**101.8**
Computer Systems	123.9	**123.6**
Software & DP Services	130.8	**131.6**
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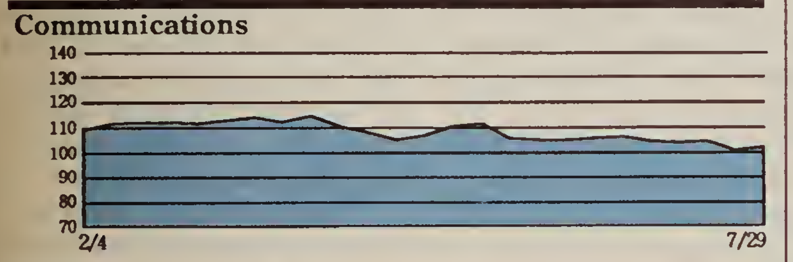
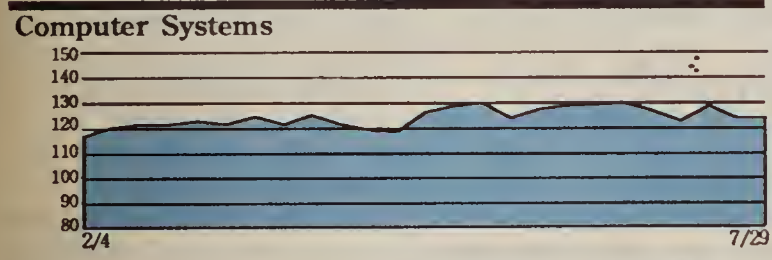
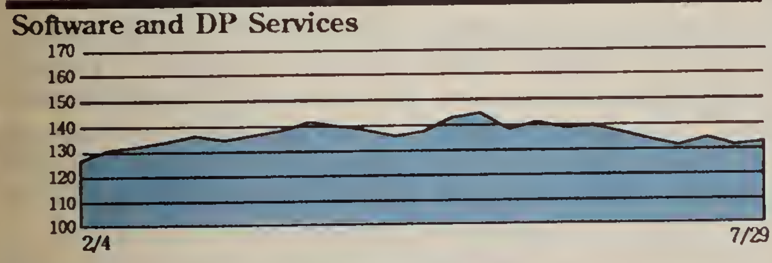
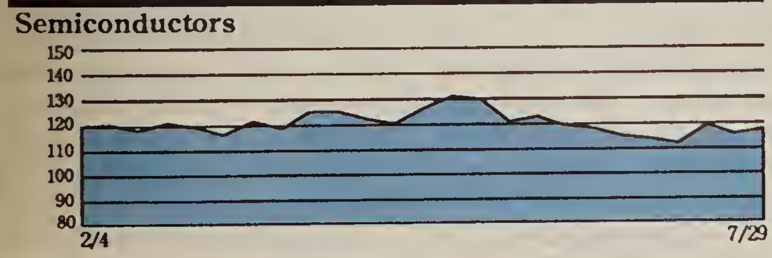
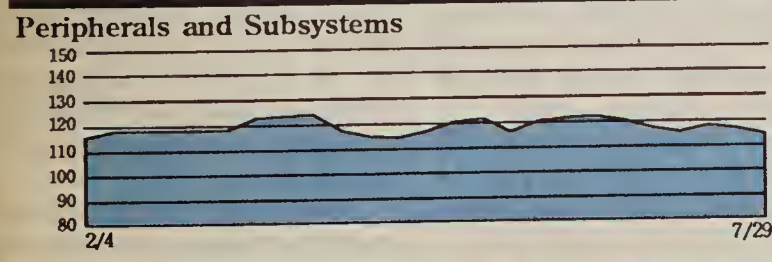
Leasing Companies	120.4	**116.7**
Composite Index	103.2	**103.1**
S&P 500 Index	126.4	**129.4**

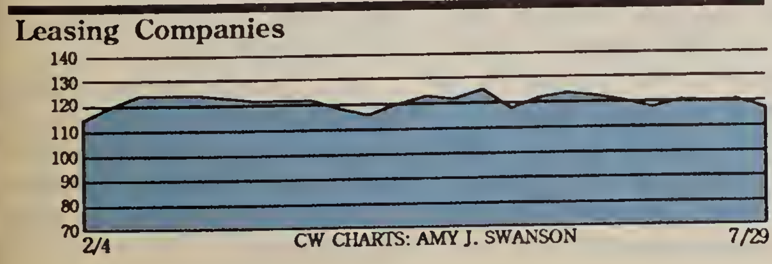












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CLOSING PRICES WEDNESDAY, JULY 29, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	:01	77	87.88	+4.9	+5.9
Q	ANDREW CORP	19	14	17.00	+2.0	+13.3
Q	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	33	22	32.38	+1.8	+5.7
Q	AVANT GARDE COMP INC	7	3	3.06	+0.3	+11.4
Q	AVANTEK INC	19	13	14.63	+0.6	+4.5
N	AYDIN CORP	38	18	32.63	-0.1	-0.4
N	8ELL ATLANTIC CORP	77	62	67.50	+2.0	+3.1
N	8ELLSOUTH CORP	46	35	39.00	+2.0	+5.4
Q	8RIOGE COMMUNICATION	27	11	20.38	-0.6	-3.0
Q	COMPRESSION LABS INC	13	4	4.69	-0.2	-3.8
O	COMPUTER NETWORK TECH	8	4	4.06	-0.2	-5.8
O	CONTEL CORP	35	27	33.25	+0.8	+2.3
Q	DATA SWITCH CORP	9	5	6.38	-0.1	-1.9
Q	DIGITAL COMM ASSOC	49	17	34.50	+0.0	+0.0
Q	OYNATECH CORP	44	27	28.13	-1.6	-5.5
Q	EQUATORIAL COMM CO	6	2	3.25	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	5	7.00	-1.3	-15.2
Q	GENERAL DATACOMM INOS	14	8	8.88	+0.6	+7.6
N	GTE CORP	43	34	39.38	+1.0	+2.6
Q	INFOTRON SYS CORP	13	7	9.00	+0.5	+5.9
N	ITT CORP	66	47	62.63	+0.6	+1.0
N	M A COM INC	16	12	15.63	+0.8	+5.0
Q	MCI COMMUNICATIONS CORP	9	5	7.88	+0.4	+5.0
Q	MICOM SYS INC	18	10	11.13	+0.8	+7.2
Q	NETWORK SYS CORP	19	9	10.38	+0.1	+1.2
N	NORTHERN TELECOM LTO	24	14	22.00	+0.4	+1.7
Q	NOVELL INC	27	9	18.50	-0.8	-3.9
N	NYNEX CORP	73	59	68.25	+1.8	+2.6
N	PACIFIC TELESIS GROUP	31	23	26.38	+1.1	+4.5
N	PARAOYNE CORP	8	4	6.88	+0.0	+0.0
A	PENRIL CORP	6	4	4.50	-0.1	-2.7
N	PLESSEY PLC	41	24	34.00	-0.1	-0.4
N	SCIENTIFIC ATLANTA INC	20	9	16.75	-0.1	-0.7
N	SOUTHWESTERN 8ELL CORP	41	33	37.13	+2.1	+6.1
Q	3 COM CORP	24	9	14.75	-1.8	-10.6
N	TIMEPLEX INC	41	14	33.00	+1.4	+4.3
Q	UNGERMANN 8ASS INC	16	7	11.13	-0.5	-4.3
N	U S WEST INC	62	45	51.75	+2.0	+4.0

Computer Systems

Q	ALLIANT COMPUTER SYS	37	16	20.25	+0.0	+0.0
Q	ALPHA MICROSYSTEMS	7	3	5.00	-0.1	-2.4
Q	ALTOS COMPUTER SYS	17	10	12.25	-0.3	-2.0
A	AMDAHL CORP	42	17	36.50	-0.3	-0.7
Q	APOLLO COMPUTER INC	25	9	18.25	-0.8	-3.9
Q	APPLE COMPUTER INC	45	15	41.00	·1.5	-3.5
N	8OLT 8ERANEK & NEWMAN	30	18	20.00	-19.3	-49.0
Q	8RITTON LEE INC	5	3	2.50	-0.1	-4.8
N	COMPAQ COMPUTER CORP	51	13	47.00	+0.4	+0.8
Q	COMPUTER AUTOMATION INC	17	2	11.75	-0.8	-6.0
A	COMPUTER CONSOLES INC	12	7	8.75	+0.4	+4.5
Q	CONCURRENT COMP CORP	20	11	20.00	+1.8	+9.6
N	CONTROL DATA CORP OEL	35	20	27.63	-0.9	-3.1
Q	CONVERGENT TECH	12	4	7.25	+0.0	+0.0
Q	CONVEX COMPUTER CORP	22	8	14.00	-0.8	-5.1
N	CRAY RESH INC	136	69	101.88	+4.4	+4.5
Q	DAISY SYS CORP	13	7	7.00	-0.8	-9.7
N	DATA GEN CORP	39	25	32.00	+2.1	+7.1
N	DATAPOINT CORP	9	4	6.13	-0.1	-2.0
N	DIGITAL EQUIP CORP	175	87	160.50	+2.0	+1.3
N	FLOATING POINT SYS INC	19	8	11.50	+0.5	+4.5
N	GOULD INC	23	16	23.13	+2.8	+13.5
N	HARRIS CORP DEL	43	27	34.50	-0.3	-0.7
N	HEWLETT PACKARO CO	67	37	62.00	+2.1	+3.5
N	HONEYWELL INC	88	58	82.75	-0.6	-0.7
N	I8M	170	116	161.50	+0.1	+0.1
Q	INFORMATION INTL INC	17	13	14.25	-0.3	-1.7
Q	IPL SYS INC	3	2	3.13	-0.1	-3.8
Q	MASS COMPUTER CORP	10	5	8.50	+0.3	+3.0
N	MATSUSHITA ELEC INOL LTD	169	81	168.25	+21.0	+14.3
Q	MEGADATA CORP	7	2	5.00	-0.3	-4.8
Q	MENTOR GRAPHICS CORP	34	11	28.63	+0.3	+0.9
N	N8I INC	14	8	13.13	+0.3	+1.9
N	NCR CORP	80	42	78.25	+2.5	+3.3
N	PRIME COMPUTER INC	30	16	26.13	+0.1	+0.5
Q	PYRAMID TECHNOLOGY	12	4	8.00	-0.3	-3.0
Q	STRATUS COMPUTER	41	18	27.00	+0.5	+1.9
Q	SUN MICROSYSTEM INC	46	11	35.25	-0.9	-2.4
Q	SYM8OLICS INC	8	4	4.38	+0.5	+12.9
N	TANDEM COMPUTERS INC	38	16	28.88	+0.4	+1.3
N	TANDY CORP	56	31	45.38	+1.5	+3.4
N	ULTIMATE CORP	30	13	27.88	+0.6	+2.3
N	UNISYS CORP	132	65	129.38	+2.9	+2.3
A	WANG LABS INC	19	11	16.75	+0.5	+3.1

Software & DP Services

Q	AOVANCED COMP TECH	6	3	3.63	+0.0	+0.0
N	ADVANCED SYS INC	25	12	23.00	-0.3	-1.1
N	AGS COMPUTERS INC	22	8	18.88	+2.3	+13.5
Q	AMERICAN MGMT SYS INC	19	7	17.13	+1.1	+7.0
Q	AMERICAN SOFTWARE INC	22	7	15.75	-0.1	-0.8
N	ANACOMP INC	10	3	9.88	+0.9	+9.7
Q	ANALYSTS INTL CORP	9	3	7.25	-0.5	-6.5
Q	ASHTON TATE	30	10	23.00	-1.8	-7.1
Q	ASK COMPUTER SYS INC	17	10	13.38	+0.0	+0.0
Q	AUTODESK INC	285	8	22.00	+0.0	+0.0
N	AUTO DATA PROCESSING	51	29	47.50	+0.8	+1.6
Q	8OOLE & 8A88AGE INC	11	4	11.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	29	10	24.13	+0.3	+1.0
Q	COMPUTER HORIZONS CORP	15	10	13.25	-0.8	-5.4
N	COMPUTER SCIENCES CORP	61	30	55.75	+3.9	+7.5
N	COMPUTER TASK GROUP INC	18	11	12.25	-0.3	-2.0
Q	COMSHARE INC	28	11	24.00	-0.5	-2.0
N	CULLINET SOFTWARE INC	13	6	12.25	+0.3	+2.1
Q	CYCARE SYS INC	12	7	8.63	+0.3	+3.0
Q	OUQUESNE SYS INC	33	12	19.00	+3.0	+18.8
Q	ENOATA INC	12	5	9.63	-0.3	-2.5
N	GENERAL MTRS (CLS E)	45	24	42.38	+0.4	+0.9
Q	HOGAN SYS INC	17	9	13.63	+2.6	+23.9
Q	INFORMIX CORP	23	7	19.00	-0.8	-3.8
Q	INTELLICORP INC	11	4	7.00	-0.8	-9.7
Q	KEANE INC	10	5	8.00	+0.3	+3.2
Q	LOTUS OEV CORP	37	9	30.50	-1.0	-3.2
Q	MANAGEMENT SCI AMER	21	11	12.00	-0.4	-3.0
Q	MICRO PRO INTL CORP	8	2	5.50	-0.3	-5.4
Q	MICROSOFT CORP	128	26	99.25	-0.8	-0.8
Q	NATIONAL DATA CORP	27	17	26.88	+1.9	+7.5
Q	ON LINE SOFTWARE INTL INC	20	6	17.38	+0.8	+4.5
Q	ORACLE SYS CORP	30	7	20.75	-0.8	-3.5
N	PANSOPHIC SYS INC	23	12	18.00	-1.0	-5.3
Q	POLICY MGMT SYS CORP	30	15	23.50	-1.3	-5.1
Q	PROGRAMMING & SYS INC	13	8	11.00	-0.5	-4.3
Q	REYNOLDS & REYNOLDS CO	42	27	33.00	+0.0	+0.0
Q	SEI CORP	18	8	15.75	-1.0	-6.0
Q	SHARED MED SYS CORP	53	23	25.38	-2.6	-9.4
Q	SOFTWARE AG SYSTEMS INC	20	10	12.50	-0.8	-5.7
Q	SOFTWARE PU8G CORP	17	5	9.25	+1.1	+13.8
A	STERLING SOFTWARE INC	19	9	9.88	-0.3	-2.5
Q	SUNGARD DATA SYS INC	21	10	18.00	-0.3	-1.4
Q	SYSTEMATICS INC	30	14	26.25	+0.0	+0.0
N	UCCEL CORP	45	19	40.75	+1.0	+2.5
N	URS CORP	21	13	18.50	+0.3	+1.4
Q	VM SOFTWARE INC	45	15	17.50	+0.5	+2.9

Semiconductors

N	ADV MICRO OEVICES INC	25	13	17.88	+1.0	+5.9
N	ANALOG OEVICES INC	24	14	21.50	+0.3	+1.2
Q	ANALOGIC CORP	13	10	12.00	+0.1	+1.1
Q	INTEL CORP	51	16	47.25	+0.8	+1.6
Q	LSI LOGIC CORP	17	8	10.63	+0.6	+6.3
Q	MOÑOLITHIC MEMORIES INC	19	10	15.25	+1.0	+7.0
N	MOTOROLA INC	64	34	56.75	+1.6	+2.9
N	NATL SEMICONDUCTOR	17	8	12.88	-0.3	-1.9
N	TEXAS INSTRS INC	68	34	59.75	-0.8	-1.2
A	WESTERN OIGITAL CORP	33	12	26.50	-1.3	-4.5

Peripherals

N	AM INTL INC	9	5	7.63	+0.5	+7.0
Q	AST RESH INC	23	11	15.00	+0.3	+1.7
Q	AUTO TROL TECH CORP	9	3	6.50	+0.0	+0.0
Q	8ANCTEC INC	16	6	12.50	+0.0	+0.0
Q	CIPHER DATA PRODS INC	18	9	10.00	-0.3	-2.4
A	COGNITRONICS CORP	5	2	3.88	+0.0	+0.0
N	COMPUGRAPHIC CORP	24	16	23.50	+0.3	+1.1
N	COMPUTERVISION CORP	23	11	15.00	+0.0	+0.0
N	CONRAC CORP	30	12	0.00	-27.3	-100.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.0	+0.0
A	DATARAM CORP	10	7	7.25	+0.0	+0.0
N	OECISION INDS CORP	13	7	12.00	-0.5	-4.0
N	EASTMAN KODAK CO	94	52	93.88	+5.1	+5.8
Q	E M C CORP MASS	34	11	28.75	-2.8	-8.7
Q	EMULEX CORP	10	6	7.63	+0.0	+0.0
Q	EVANS & SUTHERLANO	40	20	30.00	-0.5	-1.6
Q	ICOT CORP	13	5	6.38	+0.0	+0.0
Q	INTERLEAF INC	20	8	15.88	-1.0	-5.9
Q	IOMEGA CORP	12	2	3.13	+0.0	+0.0
Q	LEE DATA CORP	10	5	5.13	+0.1	+2.5
Q	MASSTOR SYS CORP	6	2	5.44	-0.3	-5.4
Q	MAXTOR CORP	34	12	14.13	-1.8	-11.0
Q	MICROPOLIS CORP	44	14	32.00	-3.6	-10.2
Q	MINISCRI8E CORP	18	5	12.75	-0.4	-2.9
N	MINNESOTA MNG & MFG CO	73	50	72.25	+2.5	+3.6
A	MSI DATA CORP	19	10	18.00	+0.9	+5.1
Q	PRIAM CORP	6	2	3.50	-0.1	-3.4
Q	PRINTRONIX INC	14	10	11.25	-1.3	-10.0
N	QMS INC	22	11	19.00	+0.0	+0.0
Q	QUANTUM CORP	35	15	17.00	+1.0	+6.3
Q	RAMTEK CORP	6	4	5.00	+0.0	+0.0
N	RECOGNITION EQUIP INC	27	10	18.63	-0.3	-1.3
Q	REXON INC	14	5	9.25	+0.3	+2.8
Q	SCAN TRON CORP	17	11	12.50	+0.0	+0.0
Q	SEAGATE TECHNOLOGY	46	11	27.00	-1.6	-5.7
N	STORAGE TECH CORP	5	2	3.63	+0.0	+0.0
Q	TANDON CORP	7	2	4.88	-0.4	-7.1
A	TEC INC	7	3	5.25	+0.1	+2.4
N	TEKTRONIX INC	43	28	37.50	-0.4	-1.0
Q	TELEVIDEO SYS INC	3	2	2.38	-0.1	-5.0
N	TELEX CORP	102	53	65.00	-2.3	-3.3
Q	WYSE TECH	35	13	31.38	+1.1	+3.7
N	XEROX CORP	81	51	74.50	+2.0	+2.8
Q	XIDEX CORP	20	11	12.88	+0.0	+0.0

Leasing Companies

N	COMOISCO INC	33	15	29.50	+0.5	+1.7
N	CONTINENTAL INFO SYS	14	7	10.50	-0.8	-6.7
Q	PHOENIX AMERN INC	8	3	4.25	-0.4	-8.1
Q	SELECTERM INC	7	5	5.63	-0.4	-6.3
N	U S LEASING INTL	53	38	52.63	+2.1	+4.2

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL;
O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE 8ID PRICES AS OF 3 P.M. OR LAST 8IO
(1) TO NEAREST DOLLAR

Wallflower

High tech stays on fringe of market's week-long bash

The overall stock market had a party last week, and while the computer industry got to dance a little bit, it wasn't invited to the main festivities.

While the Dow Jones industrial average soared to new highs and other market indicators also climbed, most leading computer stocks registered only modest gains. The week's activity indicated that investors are remaining cool to high-tech stocks after those stocks' surge in the last several months.

That trend was particularly true of Compaq Computer Corp. and Sun Microsystems, Inc., which both reported outstanding quarterly results. But Sun gained only 1¼ points to 36⅛ in four days of trading, while Compaq fell ½ of a point to close Thursday at 46½.

The lackluster pattern was reflected in the stocks of IBM, up 1½ points to 162⅜; Digital Equipment Corp., unchanged at 162½; NCR Corp., up 2¼ points to 78⅜; Apple Computer, Inc., down 1 point to 41½; Apollo Computer, Inc., up ⅝ of a point to 19⅛; Data General Corp., up 1¼ points to 32½; and Microsoft Corp., down 1½ points to 97.

CLINTON WILDER

Users heeding COS call-up

Consortium's campaign attracts federal, civilian heavyweights

BY MITCH BETTS
CW STAFF

MCLEAN, Va. — A recent campaign by the Corporation for Open Systems (COS) consortium to attract more users as members is starting to pay off, although users are still outnumbered by vendors by a ratio of more than 2-to-1.

In recent weeks, COS has signed up Morgan Guaranty Trust Co. of New York; the Defense Communications Agency, which is part of the U.S. Department of Defense; and the National Communications System, a federal office that oversees military and civilian communications during national emergencies.

Moreover, sources said the National Bureau of Standards, representing all civilian federal agencies, is expected to officially join COS in the next few weeks. The agency may join either as a full member or as an "alliance associate," like the MAP/TOP Users Group.

COS is a consortium started by vendors to speed up the development of products that meet Open Systems Interconnect and other standards for systems interoperability. The group will also test product compliance with the standards.

The recent additions bring COS membership to 68, including 46 vendors and 19 voting members from the user community. With users making up 28% of the membership, COS is still short of its goal of 50% user membership.

MIS unconvinced

Several corporate MIS and communications managers interviewed last week said either they had not heard about COS or that they saw no compelling reason to spend $25,000 for full membership.

"The issue we'd have to consider, besides the money to join, is setting aside the resources [such as a staff member] to participate and make it worthwhile," said Bernard J. Survoy, assistant vice-president of technical support for Ameritrust Co. in Cleveland.

Survoy and other MIS executives said the high cost of joining COS, in terms of dues and staff time, would limit COS membership to only the very largest corporations in the country.

Current user members of COS include such corporate giants as General Motors Corp., Du Pont Co., Citicorp, Aetna Life & Casualty Co., Procter & Gamble Co., Eastman Kodak Co. and Dow Chemical Co.

Testing the waters

Sources said that two major network users organizations, the International Communications Association (ICA) and the Tele-Communications Association, are considering joining COS, but only as affiliate members.

Affiliate members pay dues of $500 a year but cannot vote or attend the COS Strategy Forum meetings at which policy is established. Full voting members pay dues of $25,000 to $200,000 and must be either profit-making businesses or government agencies.

ICA and COS officials met last week to discuss ICA membership. "We want to see what this $500 affiliate membership will do for us," said Chester Bellairs, the former ICA president who is negotiating with COS.

"We know we'll get mailings and updates on issues, but we'll have no vote or real participation when they meet," Bellairs said, expressing concern that affiliate members will have little clout in the organization.

Newsletter dialogues

Ted Manakas, information products manager at COS, defended the affiliate membership as an information exchange program that allows affiliates to make comments in the COS newsletter and receive COS responses. Furthermore, he said, COS is planning an annual affiliates' conference to foster a dialogue between the affiliates and the COS Strategy Forum.

"It's better to be in the process in some form than out of the process," Manakas stressed. He expressed hope that corporate members of associations that are COS affiliate members will consider "stepping up" to full COS membership once they see the value of participating in COS.

Manakas said COS has a concerted recruitment program aimed at companies from particular industries, such as banking and insurance. For example, it is easier to persuade a bank to join, he said, when he explains the consortium's high-priority projects include security and transaction-processing standards.

AST reworks printer

Says Turbolaser meets Laserjet for $600 less

IRVINE, Calif. — AST Research, Inc. last week announced a version of its Turbolaser printer that it said offers the same capabilities as the Hewlett-Packard Co. Laserjet II printer for $600 less.

The 8 page/min Turbolaser/EL incorporates a Ricoh Corp. 4081 engine that reportedly can handle 5,000 to 10,000 pages per month and has a life expectancy of 600,000 copies.

The printer also includes AST's Laser Printer Controller, an IBM Personal Computer expansion board that enables HP Laserjet and Diablo Systems, Inc. Diablo 630 emulation.

The printer, priced at $1,995 and scheduled to be available in September, is said to offer a variety of configurations appropriate to either low-end word processing or computer-aided design applications.

AST said three upgrade kits will be available, including a 512K-byte memory upgrade for $395 and the $995 XL Language Option, which includes Diablo 630 and HP Graphics Language emulation.

The Adobe Systems, Inc. Postscript option is available for $2,495. It includes three communications channels for RS-232C serial, RS-422/Apple Computer, Inc. Appletalk serial and Centronics Data Computer Corp. parallel ports. The Postscript option also offers 35 printer-resident Adobe fonts, AST said.

Twelve additional font packages are available for $199 each.

VAX 8000 line upgraded

MERRIMACK, N.H. — Digital Equipment Corp. provided growth paths last week for its VAX 8000 series users with the long-expected announcement of upgrades for four models.

DEC had been promising the upgrades to customers for several months [CW, May 4]. The announced growth paths let users move from the VAX 8200 to the 8250 or dual-processor 8350, from the 8530 to the 8550 and from the 8700 to the dual-processor 8800.

The "50" models were announced in March.

Starting prices for the VAX 8000 series upgrades range from $34,000 for an 8250-to-8350 upgrade to $336,000 for a 8700-to-8800 conversion.

Apple to announce Juggler; seen as response to PS/2

BY PATRICIA KEEFE
CW STAFF

BOSTON — Apple Computer, Inc. is expected this week to announce a multitasking extension to its Finder operating system that will be positioned as Apple's official response to IBM's Personal System/2, sources said.

Apple will unveil the operating system extension, which is code-named Juggler and scheduled for a September delivery, at this week's Seybold Conference on Desktop Productivity, sources close to the company said [CW, July 6].

At Macworld Expo here next week, Apple is expected to follow up with the release of a slew of connectivity products, including a version of Appletalk with speeds up to 1M to 2M bits.

In October 1986, Apple Chairman John Sculley said Apple would devote the following 18 months to delivering IBM-compatible communications.

What to look for

Among the expected introductions are the following:

- A faster, intelligent Appletalk running on unshielded twisted-pair and able to accommodate a mixture of slow and fast Appletalk by adjusting the data transmission rate.
- Software for the Appletalk PC adapter card, which was introduced earlier this year. PC Appleshare is said to resemble Centram Systems West, Inc.'s TOPS and to allow IBM computers to fully participate on Appletalk.
- Ethertalk, which was announced in January. It consists of cards from 3Com Corp. and Apple software that connects Mac users to Ethernet.

3Com will follow with its own Ethernet card for Appletalk, priced significantly less than the Apple product, a 3Com executive said.

- A letter-quality upgrade to the Imagewriter II featuring a Toshiba Corp. engine, a 24-pin dot matrix printer, improved speed and resolution and the ability to handle complex graphics.

The Imagewriter LQ will serve as a bridge between the older model and a new Laserwriter slated for a fall introduction.

- Two facsimile modems running at 9.6K bit/sec.: an onboard device for the Mac II and an add-in card for the Mac SE.

West Coast bureau chief Kathy Chin and West Coast correspondent Julie Pitta contributed to this report.

Graphics manager tool arrives

BY JAMES A. MARTIN
CW STAFF

TORRANCE, Calif. — Ashton-Tate last week introduced its Master Graphics Presentation Pack, a $595 software package that combines three graphics management packages with a common menu interface.

Master Graphics consists of Chart-Master, Sign-Master and Diagram-Master, packages that Ashton-Tate acquired last year from Decision Resources, Inc. in Westport, Conn. The software is available in 5¼-in. format for IBM Personal Computers and compatibles with a minimum of 384K bytes of random-access memory and in 3½-in. format for the Personal System/2 models.

The Master Graphics Presentation Pack, available now, features one "umbrella" menu that enables hard-disk users to install the three graphics packages at one time. A hard disk is required to use the master menu, an Ashton-Tate spokeswoman said.

Master Graphics reportedly supports seven type styles in 16 sizes, 94 business symbols and italics, color and underline highlighting. Approximately 130 printers, plotters and film recorders are supported.

Link for flexibility

Combining the three packages is "an excellent idea," said Diane Schlottmann, a graphics product specialist with Marine Midland Bank NA in Buffalo, N.Y., and a user of all three graphics products. "Marrying those packages would save us time and give us a great deal more flexibility for our graphics needs," she added.

The trio of graphics products in Master Graphics is "fun to work with, easy to use and trouble-free," said James Karl, office automation systems manager for Owens-Corning Fiberglas Corp. in Wayne, Pa. "Together, it's a complete program."

Chart-Master is said to enable users to create bar, area, scatter and pie charts for business reports and proposals. Data can be accessed from Ashton-Tate's Dbase or Lotus Development Corp.'s 1-2-3 spreadsheet program.

Sign-Master creates word charts for outlines and summaries, and Diagram-Master is used for creating Gantt charts and customized diagrams.

The three software packages will continue to be sold individually in both 5¼- and 3½-in. formats. A fourth Master Graphics package, Map-Master, is available separately.

Compaq sales robust, still unscathed by PS/2

BY ED SCANNELL
CW STAFF

HOUSTON — Compaq Computer Corp.'s sales appeared to be relatively unaffected by IBM's Personal System/2 line as the company last week reported record revenue and earnings figures for this year's second quarter.

Compaq said earnings rose to $31 million, a 219% increase over last year's second-quarter earnings, while sales rose 82% to $268 million. The company reported revenue and earnings for the first six months of this year of $478 million and $51 million, respectively.

"It looks like Compaq has done extraordinarily well" since the introduction of the PS/2 series in April, said Harvey Allison, an analyst with Wertheim, Schroder & Co. in New York. "The only question mark in Compaq's remarkable sales growth is whether they are serving as a substitute for IBM offerings that have been pulled back or can't be built fast enough."

Strength test

Some analysts said they think the true test of Compaq's strength will come sometime next year, when IBM stops producing most of its existing Personal Computer XT and AT systems and devotes its marketing and manufacturing efforts to the PS/2 line.

Earlier this year, IBM announced that it would stop production on all models of its XT and AT lines with the exception of the PC XT/286 and PC AT/339.

In June, William Lowe, president of IBM's Entry Systems Division, said there was no date set for when IBM would stop producing the XT/286 and AT/339 but that he was consulting with corporate accounts and dealers to see how many more of the systems they wanted.

Lowe also said that as of mid-June, IBM had shipped 250,000 PS/2s. Analysts said, however, that most of those shipments were PS/2 Model 30s, which contain the industry-standard architecture and not the Micro Channel architecture IBM hopes to create as the new standard.

Compaq's impressive second-quarter growth is attributed largely to its two latest products, the Compaq Portable III and the 12-MHz version of its Deskpro 286, according to company President and Chief Executive Officer Rod Canion. He said the two products have become the most successful the company has ever produced.

The other product contributing significantly to Compaq's second-quarter revenue was the Deskpro 386, Canion said.

Compaq shipped an estimated 90,000 units during the second quarter, according to Michael Geran, an analyst with E. F. Hutton & Co. "We had expected a strong quarter [from Compaq], but we got an excellent quarter," Geran said.

At an analysts' meeting in New York last week, Compaq officials said they do not see a compelling reason to develop a system compatible with the PS/2's Micro Channel. They indicated, however, that they would provide systems compatible with the PS/2's Video Graphics Array and 3½-in. disk drives if customer demand is great enough.

Microsoft buys Forethought

Cements grip on Mac applications market with purchase of developer

BY PATRICIA KEEFE
CW STAFF

REDMOND, Wash. — Microsoft Corp. last week acquired Forethought, Inc., a third-party developer of applications for Apple Computer, Inc.'s Macintosh, for $14 million in cash and designated the firm as its new Graphics Business Unit.

Analysts lauded the transaction as a big plus for both Microsoft, which gains a foothold in the emerging presentation graphics market, and Apple, which is assured of Microsoft's continued interest in developing for the Macintosh.

The purchase cements Microsoft's grip on the Macintosh applications market, observers said. Prior to buying Forethought, Microsoft controlled an estimated 50% of the Mac software market as well as three Mac product categories.

Product lead

Jeff Raikes, Microsoft's director of applications development, claimed the addition of the two Forethought products — Filemaker Plus, a low-end data base, and Powerpoint, a presentation graphics application — gives Microsoft the lead in five Macintosh product categories.

Under the agreement, the Sunnyvale, Calif.-based Forethought will serve as a Silicon Valley development and marketing facility for a new generation of graphics-based applications.

Microsoft said it will begin reselling the $395 Powerpoint package almost immediately. Negotiations are reportedly under way with the developer of Filemaker Plus for the transfer of exclusive marketing rights from Forethought to Microsoft. Microsoft will continue to sell its own File program, but marketing emphasis will shift to Filemaker Plus, Raikes said.

Rob Campbell, Forethought's president and chief executive officer, said he will stay with Microsoft temporarily as a senior consultant to ensure a smooth transition and bring Microsoft up to date on desktop graphics.

Pansophic ties data tool to DB2, SQL

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — Pansophic Systems, Inc. announced an interface last week that it said will tie its widely installed Easytrieve Plus data retrieval package to IBM's DB2 relational data base management system and to IBM's SQL/DS query language.

The interface is expected to offer Easytrieve Plus's installed base of 4,800 sites a means to access data from IBM's relational DBMS products through programs developed with Easytrieve. "We've jumped on the SQL bandwagon," said Ken Bowden, product manager of Easytrieve Plus. "Now, Easytrieve Plus has access to all of the standard IBM file structures, including DB2 and IMS."

Pansophic also said it plans to incorporate the SQL standard throughout its product line, as has already been done with the company's Telon applications generation product.

The DB2 SQL/DS Interface is available immediately for all IBM mainframe operating system environments, including MVS, MVS/XA, DOS/VSE and VM. The price for MVS, MVS/XA, VM/CMS and OS/VS users is $15,000, while the price for DOS and DOS/VSE users is $12,000. Those prices are in addition to Easytrieve Plus, which is separately priced at $27,000 for large systems and $21,000 for DOS and DOS/VSE users.

Customization

Pansophic said that by covering all major IBM environments, Pansophic's open architecture "will enable user enterprises to customize and extend data base software implementations."

"You can code any SQL statement in Easytrieve Plus in the same way you would do it in Cobol," Bowden said. "Productivity gains come from the fact that the Easytrieve language requires fewer lines of code to get the same job done."

A prime example is an SQL look-alike statement, called Select, that will deliver full SQL/DS functionality. The often-used Select statement automatically generates five standard SQL statements, reducing the complexity of query commands.

The enhancements to Easytrieve Plus on the mainframe are complemented by functions in the personal computer version of Easytrieve Plus and in the Corporate Tie micro-to-mainframe link, Pansophic said. "Users can write their applications on their PC and execute them on the mainframe," Bowden said.

Twisted-pair

FROM PAGE 1

media, have no room for new wire and literally do not know where some wires go, said Jim Rosen, vice-president of research and development for New York-based network reseller LAN Systems, Inc., also a Synoptics beta-test site.

At the same time, many users are trying to formulate corporatewide networking strategies, and some are rejecting out of hand any network that requires new wiring. Analysts said this resistance has forced major Ethernet vendors to jump on the telephone wire bandwagon.

Bulk and cost are the primary downsides to broadband and coaxial cable, according to Jeff Kaplan, an analyst with International Data Corp. in Framingham, Mass. Both types of wiring can also prove difficult to access. Conversely, twisted-pair is available, inexpensive and easy to use, he said.

A rough breakdown of user wiring costs per foot is about 4 cents for two-pair, unshielded twisted-pair wire vs. almost $1 for thick, yellow coaxial cable. Pricing per foot for IBM cabling includes: 5 cents for Type 3, $1 for plenum-grade Type 1 and $1.40 for plenum-grade Type 2.

Users are increasingly endorsing twisted-pair as their cabling of choice for the next five years. Many users said they fear investing in a cabling system that may not meet all their long-term needs.

Network needs

"A year ago, I was convinced I needed IBM's Cabling System, in part because some of our users needed a high-speed network," said Tad Pinkerton, director of the office of information technology at the University of Wisconsin in Madison, another Synoptics beta-test site. He rejected IBM's cabling as too costly and too bulky.

The university is testing a 16-node network spread out across two floors of a new computer science center and is running data and voice-grade wires side by side. Pinkerton said he is enthusiastic about the results. "We haven't had a single error," he said.

It is difficult to quantify the cost savings of not having to pull new wire, since every installation is different. But Howard Charney, a 3Com cofounder and vice-president of hardware, said most users can readily compute their own savings. In New York, the cost of pulling cable ranges from $350 to $1,000 per workstation, LAN Systems' Rosen said. Using existing wiring eliminates that cost.

Deterioration

Synoptics and 3Com have taken separate approaches to solving the problems of running a high-speed network over twisted-pair wires. Although high speeds typically deteriorate over longer distances, both vendors claimed to have resolved that issue. Synoptics is supporting distances up to 330 ft. Charney said 3Com is supporting a minimum distance of 250 ft but will go "hundreds of feet beyond."

The claims are the same, but the systems are different. 3Com is seeking a patent on its product, a tap box that shuffles bits between a station's Ethernet coaxial cable and a modular phone wire in a twisted-pair cabling scheme. The Ethernet bus takes on the quality of a star configuration with 16-port clusters linked by coaxial cable.

Also using a hierarchical star topology, Synoptics' Lattisnet links nodes to a wiring concentrator in a wiring closet that has eight cards, each supporting eight nodes, for a total of 64 nodes. The box is then linked to a master concentrator tied to a fiber backbone. 3Com and Synoptics both support IBM's, thin coaxial and twisted-pair cable.

3Com's system requires one twisted-pair wire; Synoptics' requires two. Although many private branch exchange companies encourage users to install four twisted-pair wires, users typically install a minimum of three, Charney said. One pair is used to link the phone, while a second set is used for phones with specialized options.

Memorex to upgrade System/38

BY STANLEY GIBSON
CW STAFF

MILPITAS, Calif. — Seeking to expand its role as a supplier of add-on products for IBM systems, Memorex Corp. is scheduled to announce today that it will begin providing CPU upgrades for the IBM System/38. The move marks the first time Memorex has sold CPU upgrades for any processors.

Memorex said it will also maintain System/38 equipment as a third-party maintenance provider. Memorex also provides third-party maintenance on IBM 4300 systems and is planning to expand into complete computer room maintenance, much in the manner of TRW, Inc. and Control Data Corp.'s Engineering Services Division, according to Al Sontag, Memorex marketing manager for storage equipment products.

The CPU offering is a way for Memorex to sell more memory and peripherals, according to Sontag.

The CPU board is obtained from IBM, Sontag said, and combined with other IBM, non-IBM and Memorex equipment to complete the upgrade. A typical upgrade consists of additional memory, direct-access storage device adapters, control storage cards and a motherboard, he said. The service is available later this month.

Because the CPU is IBM's, Sontag said, the upgrade is certifiable for IBM maintenance.

Less expensive

Taken together, all components in a Memorex-supplied upgrade cost some 20% less than IBM upgrade parts, Sontag said. Memorex guarantees the upgrade to be 100% IBM compatible, Sontag added. He said Memorex is also offering rebuilt, upgraded System/38 processors that are 20% below the price IBM would charge. In a recent bid, Memorex offered a rebuilt System/38 Model 300 for the same price IBM charges for a System/38 Model 200, he said.

"Memory is frequently the highest cost item in an upgrade. And the System/38 tends to be a memory hog. You tend to run out of memory before you run out of CPU," said David Andrews, president of ADM, Inc., a System/38 consulting firm in Cheshire, Conn. "It's a creative way for Memorex to sell its own memory."

Memorex is also scheduled to announce today a laser printer and several impact printers for System/34, 36 and 38 computers, the company said.

HP ink-jet

FROM PAGE 1

being the first company to offer a printer with this particular combination of output quality, speed and price, HP will probably set a de facto industry standard," said Tom Idema, manager of MIS technology services at Westinghouse Furniture Systems, Inc. in Grand Rapids, Mich., one of HP's largest customers.

'Brilliant colors'

HP is aiming Paintjet mainly at "experienced, multipurpose personal computer users," such as electronics designers, sales managers, product managers and financial analysts, Borden said. Those users, he said, have to produce a steady stream of professional-looking graphics for internal communication and need "brilliant colors to capture a viewer's attention."

In the past, such users were forced to choose between pen plotters and dot matrix or piezo ink-jet printers to meet their graphics output needs. Pen plotters yield highly polished color graphics but can typically produce only one page of output every 30 minutes and cost thousands of dollars — far more than most PC users can afford, Borden said.

Color dot matrix printers such as Epson's LQ-2500, by contrast, sell for less than $1,600, but their trade-off is slow throughput. When creating letter-quality text, for example, the LQ-2500 prints 90 char./sec., according to Dataquest, Inc. Senior Analyst Robert Fennell. In contrast, Paintjet generates near-letter-quality output at 167 char./sec., according to HP.

At the heart of Paintjet's printing mechanism are two removable liquid ink cartridges. One holds 60 nozzles for squirting black ink onto 8½- by 11-in. paper and comes with a sufficiently large reservoir to produce 1,100 pages of text. The other is equipped with 10 nozzles and contains enough yellow, cyan and magenta ink to yield 180 pages of color graphics.

At its highest resolution and brightest output, Paintjet is especially well suited for users who need to make overhead transparencies for in-house presentations.

Like HP's previously announced Laserjet printer family, Paintjet forms a "nice, complete package," Fennell said. HP said vendors of 55 of the most popular microcomputer applications — such as spreadsheet, word processing and graphics programs — have agreed to provide Paintjet drivers in product updates. Paintjet also supports drivers that enable it to operate with IBM Personal Computers and clones and Apple Computer, Inc. Macintoshes, Borden said.

'Real winner'

"HP may have themselves a real winner with this product," said graphics consultant Carl Machover, president of Machover Associates, Inc.

But whether Paintjet will equal or even surpass the acceptance of the company's hugely successful Laserjet line will depend partly on technological developments in the office copier field. "Sales of the printer may accelerate in a year or two, when we finally start seeing color copiers that can duplicate five or 10 masters per minute rather than forcing us to continually make originals," Machover said.

Paintjet lists for $1,395 and is available for immediate shipment.

INSIDE LINES

Stop the world and let them get on. According to a source in the user community, Lotus may be softening its stance on copy protection. The source was told that the next release of Symphony will likely be issued without the nasty encumbrance of copy protection. Now, if Lotus could just get that beast off of 1-2-3 . . .

Canaan not able. Hambrecht & Quist, Inc. has handed the assets of Canaan Computer Corp. to Accent Systems Corp. of Pittsburgh. "We intend to continue providing maintenance, spare parts and limited sales to the existing Canaan customer base, and we are evaluating whether or not anything else can be done," said Scott Os, an Accent founder, acting interim president of Canaan and Canaan's only current employee. Accent will attempt to sell the remaining inventory of Canaan's VM-based minicomputers, which fared poorly competing with IBM's 9370, he said. Maintenance revenue will be used to forestall bankruptcy, a letter to Canaan creditors reportedly said.

The plot thickens. Dialogic has brought in a partner — Phaser Systems, Inc. — on its joint-development contract with Novell to develop LAN-to-IBM host connectivity software. Both Phaser and Dialogic bring to the party IBM Systems Network Architecture and VTAM expertise that Novell lacks, sources said. While Dialogic President John Mullen refused to name Novell, he said his firm will be developing a VTAM-based micro-to-mainframe package for "a very large LAN company." That package reportedly will allow IBM PCs on multiple interconnected LANs to access IBM hosts via a VTAM link, run applications and download records. Novell President Ray Noorda has invested in both companies and is helping them in their reorganization efforts to get out of Chapter 11.

Full speed ahead? AT&T is busy readying a major product announcement for early September that is said to include the latest Olivetti PCs, including the Intel 80386-based box, and a lot of communications products. One report gaining speed has AT&T introducing a 10M-bit version of Starlan. AT&T announced in January that it is working with Synoptics on a similar project. Also possible is some initial statement on compatibility with IBM's PS/2 Micro Channel architecture and OS/2.

Sparking interest. DEC created a bit of a stir during last week's Siggraph '87show in Anaheim, Calif., when a small electrical fire started in the framework of its booth. The Tuesday mishap, which was accompanied by a shower of sparks, caused a near-total power loss to the booth. No injuries were reported, and some power was restored within a half hour of the incident.

Slip out a few bugs. Look for Apple to unveil replacement read-only memory boards for its Laserwriter printer sometime this fall. According to sources, the new boards were designed to speed up the Laserwriter as well as fix some "minor bugs" in the printer. The introduction is viewed as a precursor to Apple's long-awaited new laser printer, expected to be introduced sometime this year.

IBM probably didn't think anyone would notice. Used computer dealer and lessor Computer Merchants, Inc. has joined the list of critics of IBM's 3090 Model 120E entry-level system, calling the latest 3090 a move to get customers into an expensive upgrade trap. Computer Merchants argues that, while IBM says the Model 120E gets users into the 3090 line for less than $1 million, a buyer can get the same power from a used 3083-J for $425,000.

Will we need a hard disk? A Lotus source revealed that a new version of the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) will be released later this year. The product, which uses bank-switching techniques to allow users to go beyond the 640K-byte RAM limitation of Microsoft's MS-DOS, will receive a number of enhancements. While the current version supports up to 8M bytes of RAM, the next release could shoot as high as 32M bytes. In addition, the new EMS was designed to provide better multitasking on 80386-based machines.

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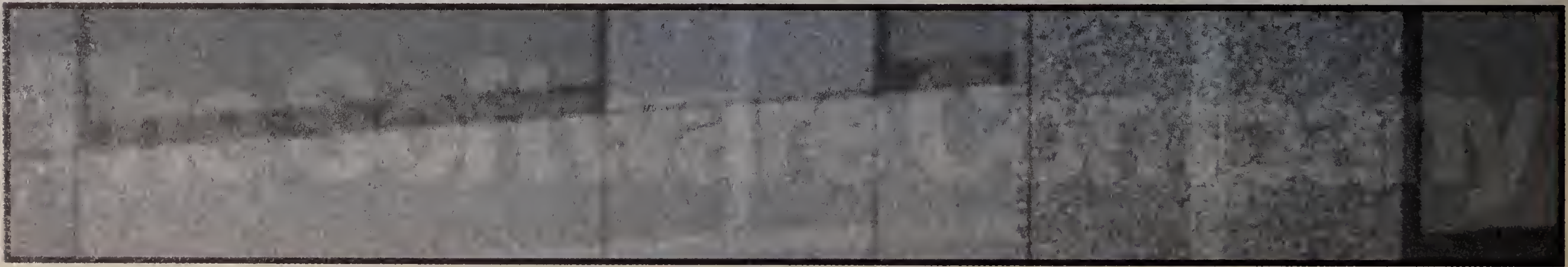

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